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The Farmer's Digest

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The Farmer's Digest

Volume 9 April, 1946 Number 12

Wanted—More Long Lived Cows

Condensed from Guernsey Breeders' Journal

E. J. Perry

New Jersey Agricultural Experiment Station

Good producing, long-lived cows are the kind that spell success for the dairyman. Much is said and written today, and rightly so, about breeding and feeding in the building of profitable herds but little attention is devoted to the advantage of longevity and what might be done to help more of our cows attain it. The writer has no panacea for the solving of this problem. His chief desire is to stimulate discussion and increase interest in the hope that more progress in the phase of herd management and improvement will be made.

A dairy cow is mature in milking ability at five to six years old. Age does not markedly affect the lactation record between this point and 10 to 12 years of age. At least one-third of all good producers have been proving sterile after 10 years of age. On the average, in the grade herds of the country, a cow is milked between five and six years, but many herds have a few cows that produce and reproduce for more than 10 years. The turnover in United States dairies is considerably more rapid than in European countries. Cows remain in Danish herds for approximately seven lactations as compared with about five lactations for cows in this country.

Some years ago Wilber J. Fraser of Illinois called attention to the great economy of long-lived cows by proving that one good cow producing to 10 years of age makes as much profit as three cows of the same ability, each of which produces to six years of age. It requires approximately two years to raise each cow and two more years to pay the cost of rearing or buying her. The cow that lasts for 10 years produces for eight years, thus giving her six profitable years. Since each of the two cows has only two years of profitable production, their total profitable period is

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only six years or the same as that of the longer lived cow. The amount received for each cow when she is sold for beef must be used to help pay for her overhead expense and hence should not be thought of as profit. Suppose a dairyman would put up over the yoke of each freshening heifer a sign which reads, "Until she is four years old, I milk her for nothing." Such a warning would surely be a reminder of the need for the most careful kind of management of the indiviidual cows.

Mature cows from six to twelve years of age yield more milk than younger cows, or in other words, within rather wide limits the productivity of a herd increases with age. Rearing costs drop as the producing life of the cow increases. Normally the price of an aged cow is higher than that of a young cow. Added expense is involved every time a good cow is replaced. Extension of the time of usefulness means a decrease in the number of heifers added for those removed. Hence, new stock can be more carefully selected and better cattle kept. H. Wenzel Eskedal of Denmark compiled the table below based on Danish conditions, which illustrates that feed costs per unit of yield decrease with advancing age.

From birth to three and one-half years of age the total number of feed units eaten per head was 5,730 and as only one year of production occurred in this period the amount of milk per feed unit was only 1.08. But by the time the cow was 10½ years old the milk quantity per feed unit had risen to 2.42, or a 12 per cent increase. A table with similar meaning could be made up from the records of yield and feed amounts of cows in this country.

A survey of reasons for disposal of 6,053 D. H. I. A. cows other than for dairy purposes in two leading dairy states, one in the Mid-West and one in the Northeast, shows the following data:

Low Production	33 per cent
Bang's Disease	14 per cent
Udder Trouble	10 per cent
Sterility	8 per cent
Died	5 per cent
Old Age	3 per cent
Accident	3 per cent
Other Reasons	5 per cent

The other reasons include milk fever, compaction, bloat, etc. Roughly, 19 per cent of the cows were sold for dairy purposes.

Definite progress has been made in the combatting of certain diseases such as tuberculosis and milk fever, and similar headway is almost certain to be made against others; yet there is no apparent rise in the length of producing life of our cows. Is this partly due to the fact that we are overtaxing their physical powers by our demand for higher yields through excessive feeding or by unbalanced rations? The next

50 years are almost certain to yield much knowledge pertaining to better feeding methods as an aid to longevity. Visits among many of the high producing herds afford some evidence that udders of young cows, especially two-year-olds, are subjected to tremendous pressure. If these heifers could talk what would they tell us? Looking ahead to a long life for them, it might pay if we eased them along with somewhat lower production for their first lactation by giving them plentiful amounts of good roughage but somewhat less grain. Many udders begin "breaking away" at too young an age, the first step to an udder that hangs low, and that is, therefore, more liable to bruises and injury. There is reason to believe that three-time milking of real heavy producers is an udder protection and that pre-milking for 10 days or so has its merits, especially for heifers. High pressure probably is a factor in causing sterility in some cows. A very large percentage of those that make records of 800 pounds or more of fat never have another calf.

Record data reveal that life production is higher on the average with 10-month lactations than with those that are longer. Even with the 10-month period as the constant goal it is difficult for efficient dairymen to have an average of 13 months as the interval between freshening. The average for D. I. H. A. cows in New Jersey has been running a fraction over 14 months. Fertility may be lowered by delayed breeding. Some veterinary authbreeding. Some veterinary authorities believe repeated ovulations ovaries to the point where breeding troubles are more likely to occur. Long lactations also mean less young stock from which to select replacements.

The Part of Heredity

According to life insurance companies, inheritance plays a considerable part in the length of life of human beings. It seems to be established that longevity in cattle is an inherited character. In selecting breeding stock we should pay more attention to life production and length of life of the ancestors. Differences in fertility of cows and bulls are probably more often due to methods of management than to methods of heredity, nevertheless some of these variations are heredity and we should select for them the same as we select for other characters in which we are much interested. Keeping careful breeding records is good business. The progress in the program for increasing the average age of our herds will be in proportion to our keeping of more and better records of production, breeding and health.

A Normal Cow's Complete Production and Feed Requirement

From Birth to the Different Age Periods, Inclusive

Age of Cow	Cumulative Yield, Lbs.	Cumulative Feed Units Eaten	Pounds of Milk Per Feed Unit Eaten
3½	6,171	5,730	1.08
4½	13,545	8,710	1.56
5½	21,853	11,870	1.85
6½	30,844	15,140	2.05
7½	40,293	18,500	2.18
8½	49,928	21,910	2.29
9½	59,763	25,330	2.35
10½	69,443	28,740	2.42
11½	78,894	32,100	2.46
12½	88,000	35,390	2.49

There is now evidence that some animals, including cattle, are more resistant to certain diseases than are others. Lambert's experiments with White Leghorn chickens illustrates this. His continued selection for resistance to fowl typhoid was successful. Roberts developed a strain of chickens that had only 35 per cent mortality from pullorum injection as compared with 73 per cent in an unselected group. Murphy has identified a family of Guernseys at the Dairy Research Farm at Sussex, N. J., that is more resistant to mastitis infection than other family groups in the herd. However, resistance to one disease does not imply resistance to some other disease. There are good grounds for believing that selection can be used to improve the vigor of a herd and at the same time increase its resistance to disease.

More progress in the solution of the problem of difficult breeding would help markedly to increase the producing life of our cows. The problem involves both the bull and the individual cows. When the entire herd experiences breeding trouble, it may be the result of an infertile bull, inadequate nutrition or disease. Among the cows the chief troubles today are irregular heat periods, failure to show heat, and failure to conceive when bred. The veterinarian can do much to help if the owner can furnish him with complete records of breedings, calvings and heat periods. Regular pregnancy examinations save time in the breeding schedule. "Problem" cows should be bred on the first or second heat if their genital organs are normal. Heifers should be so well-grown that they can be bred at 14 to 16 months so as to permit time for several services if necessary. We should not raise progeny of the chron-

ically hard breeders if it can be avoided. The home raising of more replacements usually results in a better pregnancy record.

The majority of the national breed associations now give recognition to long life production. A form of award by two of the clubs is the 100,000 pound certificate. One breed has its Ton of Gold cows—those that produce 2,000 pounds or more of fat. A number of states honor the D. I. H. A. cows that reach the 3,000 pounds of fat mark. In Switzerland every cow that has six or more living calves in a period of eight consecutive years is given a special mark in the herd-book. All of these methods of recognizing the long-timer are worthy of the highest praise.

DDT Looks Good in the Poultry House

DDT did a first-rate job of controlling bed-bugs, lice and rat fleas in trials conducted in New Jersey poultry houses this past season by Dr. John B. Schmitt, associate entomologist at the Experiment Station. It is useless against mites, however.

For controlling lice, a 10 per cent DDT dust can be broadcast on the litter at the rate of one-fourth pound for each 100 square feet of floor space. A 20 x 20 pen would take a pound of the 10 per cent dust. As the hens scratch, they throw the dust into their feathers. This will also control rat fleas, which often are bothersome to poultry.

For bedbugs, which sometimes get so numerous they hang in strings from poultry house ceilings, the simplest method is to paint the roosts with a kerosene solution containing three per cent of DDT. A little DDT dust in the nest boxes will help. This method is effective but slow. It may take a month or more to get all bugs.

For a quick cleanup of a large poultry house, Dr. Schmitt recommends buying a wettable DDT dust and using it at the rate of four pounds of actual DDT per 100 gallons of water, adding a little extra wetting agent to get better penetration. If you buy 50 per cent DDT wettable dust you will need eight pounds per 100 gallons of water. Put it in an orchard sprayer, keeping the agitator running, and go over the whole house thoroughly, using the orchard spray nozzles.

Another good method is to spray the area around the roosts and nests with a kerosene solution containing three per cent DDT. Warning. When using a kerosene solution of DDT, wear rubber gloves and put a mask over your nose and mouth. DDT in oil can be absorbed by the body. *N. J. Farm and Garden*

New Wrinkles for Potato Growers

Condensed from American Agriculturist

Ora Smith

Department of Vegetable Crops, Cornell University

IN ORDER that potato production methods be improved, it is necessary that the potato grower occasionally change his practices to take advantage of the most recent results of experimentation.

As an instance, it was considered a few years ago that the ideal way to apply fertilizer to potatoes was to put it in equal depth bands through the planter at time of planting. Where small quantities are applied to potatoes or where potatoes are grown in long rotations with little fertilizer applied to other crops in the rotation, perhaps this method of application still is the best. But on soils in a high state of fertility or where heavy fertilizer applications are made and where rotations are short with potatoes appearing often, there is a better way.

Results of experiments during the past four years on several soil types in New York State show that yields of potatoes are increased from 30 to 70 bushels to the acre by applying a portion of the fertilizer to the soil before planting. The best method has been to drill or broadcast one half of the fertilizer on the land shortly before plowing, the remainder being applied through the planter in equal depth bands. Not only were yields increased but chemical analyses of the plants showed that the nitrogen in the fertilizer was much more readily available to the plant when a portion of the fertilizer was plowed under.

Although much is said about the merits of applying a portion of the fertilizer on the plow sole or bottom of the furrow at time of plowing, in no instance did this method result in as high yields as application on the surface before plowing. Application of a portion of the fertilizer on the plow sole however, consistently resulted in higher yields than where all was placed in bands through the planter.

Many potato growers plow some or all of their land for potatoes in the fall. These growers want to know what method of application would be best under those conditions. Results of one year's work show that there was

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an increase of about 25 bushels to the acre where one half of a complete fertilizer such as 5-10-10 was broadcast on top and plowed under in the fall and the remainder in equal depth bands at planting time, compared with all in equal depth bands through the planter.

Broadcast application of one half of the fertilizer in the spring or fall plowed land and the remainder in bands at planting time resulted in only slight increases in yields over the treatment where all was applied in bands at planting time.

In many areas of New York State and particularly on the acid soils of approximately pH 5.0 it has been found in recent years that potatoes require more magnesium for maximum yields than is available in these soils. In such areas very substantial increases in yields have resulted from applications of magnesium in readily available form. On Lordstown silt loam soil, applications of 50 pounds per acre of magnesium oxide in the form of sulphate of potash-magnesia (Sulpomag) increased the yields per acre of U. S. No. 1 size potatoes from 20 to 80 bushels over the same fertilizer treatment but without the magnesium.

The cost of the magnesium is slight and would be paid for many times over by the additional yields of potatoes.

Chemical analysis showed that plants growing in soils where some form of soluble magnesium was applied contained much higher quantities of magnesium in their leaves than when no magnesium was added.

Large potatoes are not as desirable for seed purposes as the smaller U. S. 1 size or the U. S. 1 size B. Seed growers of such varieties as Sebago, Sequoia and other varieties that produce many large tubers would like to produce a higher per cent of smaller potatoes because of their adaptability to cutting and planting or using whole. Growers of Katahdin seed potatoes, a variety which sets sparsely, would like to obtain a heavier set of tubers from that variety. It now appears possible to accomplish both of these objectives economically and with little additional labor by an instantaneous dip of the cut seed potatoes in a solution of thiourea. This treatment is followed by an increase in the number of stems from each seed piece. After planting, this causes a greater number of tubers to set and hence the production of greater quantities of desirable smaller size tubers for seed purposes.

Several millions of bushels of potatoes are lost every year as a direct result of sprout growth of potatoes during storage. Shrinkage by water loss through the sprouts with resultant shrivelling

is very common. If storage house temperatures can be maintained under 40° F. very little, if any, sprout growth will occur. However, in many cases, it is impossible to attain and hold such temperatures.

Recent experiments show conclusively that sprout growth in potatoes can be prevented or greatly retarded by application of certain chemicals to the potatoes in the storage house. The most widely used of these chemicals is the methyl ester of alpha napthalene acetic acid. This chemical may be applied in any one of several forms such as (1) shredded or confettied paper which has been soaked in or sprayed with the chemical, (2) inert dusts such as talc in which the chemical has been thoroughly mixed, (3) a fine spray through a paint spray gun and (4) Aerosol bombs. For best results a small amount of the treated paper or dust should be applied with every few bushels placed in the bin so that the chemical is distributed throughout the bin. When any of these methods is used at the proper strength, potatoes may be kept dormant or with only very short sprouts for four or five months at temperatures of 50 to 55° F. or at higher temperatures for shorter periods.

The following varieties have been stored successfully by this method: Red Warba, Triumph, Cobbler, Chippewa, Russet Burbank, Russet Rural, Katahdin, Earlaine No. 2, Sebago and Sequoia. No undesirable effects on table stock potatoes have been noticeable as a result of these treatments.

We would recommend that potatoes that are to be used for seed purposes *not be treated* with this chemical until more experimental evidence can be obtained as to the rate and type of growth that will occur in the field the following season.

Soil Testing Service

Condensed from Capper's Farmer

ILLINOIS farmers are testing soil to learn what their land lacks in fertility balance. By October they had established, thru local farm bureaus, 50 county laboratories equipped to make lime, phosphorus and potash determinations, and more are in prospect. Each laboratory is in charge of a technician, usually an employe of the bureau, who has had special training for the work at the College of Agriculture.

By this means they are able to detect yield-limiting deficiencies and make corrections. It replaces the old Mother Hubbard recommendations and shotgun treatments. Dr. R. H. Bray, professor of soil fertility, says the service supplies the following specific information:

1—What is needed to balance the crop rotation.

2—The definite location in fields where treatments are needed.

3—How much of each fertilizing element is required.

4—The approximate cost of treatments.

5—About what yield increases can be expected from applying either phosphate or potash or both.

By making the recommended corrections, farmers are assured that lime, phosphorus and potash will be in proper balance for maximum yields under given conditions. This leaves only nitrogen in question. But it is presumed that will be supplied largely by legumes grown in rotation and manure applications. These measures usually require supplemental applications of commercial nitrogen.

Currently the county laboratories are not equipped to check nitrogen, but a new plant-tissue test which will detect deficiencies is coming up. When it is ready a farmer will be able to sample his growing corn, for instance, at any stage of growth, determine whether it is adequately supplied with nitrogen and make applications in time to benefit the crop.

The other big soil need, organic matter or humus, can be supplied by manure, by plowing down legumes and crop residues.

County farm bureaus underwrite the laboratories and equipment. Fees for testing, where any charge is made, are nominal and the farmer stands to save many times the cost in needless or excessive applications under the old methods. The service actually measures instead of calculating the amounts. For instance, C. M. Linsley, extension soils specialist,

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cites the experience of a Champaign county farmer. The local requirements for ground limestone applications were presumed to be 2 tons an acre. But the farmer sampled his soil and had it tested. Instead of requiring 360 tons for his quarter section, the test called for only 125 tons. The 195 tons excess called for by the blanket recommendation would have cost him $500 spread on the fields. That was enough to put rock phosphate on 65 acres at a 1,000-pound rate, which the complete test showed his land needed.

Thomas Kennedy, Whiteside county, quoted by the Illinois Agricultural Association Record, considered the testing fees inconsequential in view of several hundred dollars lost in clover seedings during 2 years because he didn't know his soil needed lime.

Bray estimates 16,000,000 Illinois acres still need limestone, 18,000,000 need phosphate, and up to 6,000,000 need potash. The cost of correcting these deficiencies at current rates would take about $25,000,000. That is an imposing total, but he says it would make 25,000,000 acres rich and productive. And to initiate the program the cost would be only $10 an acre. To continue the program 10 years would require $1 to $5 an acre a year, depending on the farmer's needs.

What assurance does a farmer have that such an expenditure for soil treatment will pay? There's 30 or more years of evidence from experiment fields scattered all over the state. Average cost of treatment for the 23 fields has been $3.60 a year and average return in crop yield increases from treatment has been $9.53. That's $5.93 an acre net annually for 30 years.

Specific fields show even better results. Tests on the Toledo field revealed that lime, phosphate and potash were needed in amounts that cost $5.78 an acre yearly. That looks like a heavy production expense until the payoff, $17.15 annually, is considered. Tests at the Aledo field indicated only limestone, clovers and crop residues were required at a cost of $1.33 an acre annually. That simple program returned $16.50 an acre every year for 30 years. The remedy at Bloomington was lime, phosphate, clovers and crop residues, which cost $2.79 an acre, and the pay rate was $10.69 annually from every acre so treated during more than 30 years. In all these cases increased corn yields were figured at 50 cents a bushel and other crops at comparable prices. Bray says there's not one of the fields where treatments, applied according to needs revealed by tests, didn't return double or treble the money invested.

Walter Graves, Richland county, has trebled feed and livestock

production on his 260 acres since he undertook a soil-improvement and fertility-balancing program. Wheat yields are up from 10 bushels to 20; corn from 10 or 12 to 35 and 40. Clover failures are limited to the severe drouth years.

How farmers are taking to the service is indicated by experience in Morgan county, where a laboratory was established in November, 1944. First tests were made in March, 1945, and by August testing had been done for 180 farms. By October, E. H. Garlich, farm adviser, estimated the number had reached 300. Within a few weeks after the Whiteside county laboratory got under way, the fall of 1944, Frank Shuman, farm adviser, reported 600 determinations had been made for 48 farms. Only 4 per cent of the samples tested high in phosphorus; 73 were low and 23 per cent medium. Only 52 per cent contained enough potash for nourishment and 48 per cent were below the required level.

Big job of the laboratories is to get the initial testing done, as a guide to farmers in effecting a favorable level for lime, phosphorus, potash, nitrogen and organic matter. But their work will not be done then. Said Bray: "Their first function is to make the fertilizer requirement test, so that farmers can add what the soil needs. Their second function is to make the performance test, to check on effectiveness of the initial treatments. Their third function is to make repeat maintenance requirement tests. After a farmer has built soil fertility to a favorable level, he will retest every 6 to 8 years and treat according to what those tests reveal. If they show continued deficiency, he'll correct it. If they show a balance, he'll adopt a program of maintenance applications or better to build a reserve."

Under the county laboratory setup, a farmer follows a definite pattern in taking samples. He is supplied with specific directions and a diagram representing a 40-acre field with 11 sampling places indicated. Four of these are in a line, 88 steps or 16 rods from the border and parallel to it and 4 on the opposite side, with 3 thru the center. Distance between the sampling areas is 110 steps and between the lines, 132 steps. Directions require that a handful of dirt be taken from each corner and the center of a square rod and that the 5 handfuls be placed in a paper sack labeled to correspond to the field and the numbered sampling area. Samples are allowed to dry naturally in the air and are then broken up so that all particles will pass thru an ordinary fly screen. Then they are taken to the laboratory. Results are reported back to the farmer, who confers with the farm adviser about treatments or attends

a group meeting where methods of soil improvement are discussed.

A control laboratory is maintained at the Illinois College of Agriculture to which occasional samples are sent for checking determinations made by county laboratories. This laboratory also affords training for technicians to man the county laboratories, and works out improved procedures for testing.

Wingard's Wonder Bean Makes Record Yields

WINGARD'S wonder bean again! The Virginia Victory pole snap bean, developed by Dr. S. A. Wingard, Virginia Experiment Station, has completed another sensational season. We visited his experimental plots at Blacksburg the last of August to marvel at the remarkable growth and productivity of this new bean hybrid. We saw poles 10 to 12 feet tall breaking down under the burden of beans that measured up to a foot long. They were as brittle as icicles and "as tender as a mother's love."

This bean was described in the January issue of *The Southern Planter*. Dr. Wingard, upon request, sent a trial sample of seed to 8,533 readers of *The Soutern Planter* with the understanding that a report be made on the bean's performance this fall. If you received one of these samples, won't you write how it did under your conditions? Mail your letter or card to Dr. S. A. Wingard, Agricultural Experiment Station, Blacksburg 12, Virginia.

There are a number of strains of the Virginia Victory bean. All do not grow and yield alike under all conditions. Some fail where others flourish. Dr. Wingard is very anxious to have reports from all sections—whether the bean yielded well or not. He has a record of the strain sent you last spring. He would like to know something about the growth, yield and adaptability of the bean in your community. Write him right away.

The Virginia Victory hybrid bean combines the disease resistance and hardiness of the old Brockton bean with the quality and productivity of the Kentucky Wonder. In addition it has hybrid vigor. Where adapted to the soil and climate, Dr. Wingard's new bean will outyield, by far, any bean now established on the market. How do we know? We have seen it demonstrated in actual garden trials at Blacksburg for the past two years.

Southern Planter

Income Out of Orchard Waste

Condensed from New Jersey Farm and Garden

S. H. Beck, Jr.

WHEN Robert C. Brooks decided he'd had enough of industrial work and bought his orchard near Moorestown, N. J., in 1938, he was appalled at the waste of apples. In big crop years a large percentage of the apples rotted on the ground. 'Most any year witnessed the waste of a considerable quantity of utility and cull fruit.

Brooks realized that there was considerable potential profit wrapped up in those wasted apples—a profit which he is salvaging by his present system. Here's how he does it:

1. High color apples—U. S. No. 1—are marketed to the fresh trade. Brooks intends to go to a consumer package, a five-pound "take-me-home" container, and expects to market his fruit on a farm-to-store-door basis, in order to keep his quality at a peak.

2. Utility apples—those with superficial blemishes or lacking in color—are peeled, cored, sliced, and sold to nearby Philadelphia bakers for the pie trade. Brooks installed machines for this purpose and keeps a crew of six women and four men busy the year round on this job.

3. Cores, peelings, and cull apples are put through a cider press and the juice is sold for industrial uses, such as the making of apple honey for curing tobacco.

4. The pomace, or apple pulp, is fed to beef steers and the manure from the steers is spread in the orchard. The steers like the pulp and seem to thrive on it when it is supplemented with some hay and pasture and a little corn toward the end of the feeding period.

Brooks started his pie-apple business four years ago and has built up a clientele that last year took close to 2 million pounds of sliced apples. It's a business that will furnish a steady outlet for a large volume of his apples during good years and bad. His baker-customers agree that fresh apple slices have a flavor that, up to now at least, can't be equalled by frozen or canned apples. As Brooks puts it: "The flavor of an apple is an ephermeral thing and apples have to be sliced fresh to make good pies."

In building up this business Brooks is rendering a substantial service to orchardists in his area, not only by helping to increase

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the demand for apple pies, but also by taking thousands of bushels of utility apples off the fresh market. His own production from the 70 acres in bearing trees is inadequate for the trade and Brooks buys large quantities of utility apples from his neighbors, serving thereby to strengthen prices for U. S. No. 1 apples.

He has a few words of caution, however, for those who might want to enter the pie-apple business. It's not all a bed of roses, by any means. It's a business that has to be kept going six days a week, 52 weeks in the year. Each afternoon except Saturday a truck leaves the Brooks orchard at 4 o'clock for Philadelphia, so the bakers will be supplied with apple slices for their night's work.

"Slicing apples is fine during October and November," Brooks points out, "but wait until May, June, and July, when apple prices are high and the percentage of waste in peelings goes 'way up. You lose money hand over fist for a while, hoping to make it up later on."

This past season, for example, Brooks, like most others, had a short crop. In order to keep the bakers supplied, he is having to put his entire crop through the slicing machine, which means sacrificing the fancy price he would have received for the U. S. No. 1's. It took plenty of sweat, both physical and mental, to build up the baker trade and he can't afford to let his customers down, even though the shoe pinches sometimes. In the four years since he started slicing apples he has never missed a delivery—not even when machinery breakdowns or bad road conditions made the task seem impossible.

Brooks became interested in apple-growing when he was working for Chipman Chemical Company. A graduate of Princeton University in 1934, where he majored in English, he had no previous training in fruit farming but found that the office of County Agent Dan Kensler was a ready source of reliable information. He is planting blocks of young trees which will ultimately bring his bearing orchard up to a total of about 150 acres. He has a cold storage plant with a 20,000-bushel capacity.

Handling a business such as this requires both brains and business ability. Now and then immediate high profits have to be sacrificed for the long pull. In the long run, however, it is business enterprises such as Brooks', built on dependability and assurance that the customer is getting a square deal, which will weather any economic nor'easters the future may blow up. Men like this are agriculture's best guarantee that the system of free enterprise will continue in the United States.

Producing Better Milk

Condensed from The Jersey Bulletin

Dr. G. M. Trout

Michigan State College

THE United States enjoys a relatively high level of milk consumption. This is due in no small part to the quality of the product, its safety, palatability and keepability. Nutritional research has proven what has been known about milk down through the ages—that it is the most nearly perfect food.

Rumors are afloat to the effect that there will be a renewed effort on the part of the Food and Drug Administration to prevent the sale of insanitary milk and cream. Also, that there is to be in the not too far distant future but one quality grade for milk for human consumption—not one for bottle milk, one for butter and one for cheese as exists generally at present.

During the past score of years, marked improvements have been made in the quality of milk production on the farm. This has resulted in large part because of (a) investigations concerning the causes and prevention of off-flavors in milk due primarily to feeds; (b) construction of better ventilated dairy stables; (c) changed practices of feeding in respect to time of milking; (d) development of milk-cooling units; (e) universal tendency toward prompt handling and cooling of milk; (f) introduction of new cleaning and sterilizing compounds; and (g) closer inspection of milk supplies.

Despite the simplicity with which high quality milk can be produced dairymen, nevertheless, often manifest interest in the following questions:

Is Aeration of Milk Necessary?

No, absolutely not, despite many opinions to the contrary. Looking back into the literature we find many references extolling the virtues of aeration of milk. Various patented devices have been placed on the market for that purpose. Controlled experiments show definitely that aeration does remove some of the off-odors which may get into milk. The secret, however, is keeping the odors out of the milk in the first place through proper stable ventilation and feeding of odor-producing feeds, such as silage, after milking. If cows breathe fresh air and are kept off odoriferous feeds for several hours prior

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to milking, the milk carries only a faint odor which seems to disappear entirely when the milk is cooled. Thus aeration seems to serve no beneficial purpose.

Should Milk Be Strained on the Farm?

No, why should it be if it is properly produced? Straining never cleans up the milk supply. It simply removes any coarse, non-soluble extraneous matter which may have fallen into the milk. Clean milk is not cleaned milk. When hair, flies, straw, bedding and manure get into milk there is something wrong with the methods of milk production which cannot be remedied by straining. Some plants require that the milk shall not be strained but be delivered as is. To be a patron of such a plant should be a privilege. May the time soon come when such requirements will be universal.

Does Milk Absorb Odors in the Stable?

The chances of milk absorbing foul odors after being drawn from the udder and before removal from the stable are extremely remote. Experiments show that freshly drawn milk placed in shallow dishes in various odoriferous surroundings in and about the stable for as long as one and one-half hours could not be segregated by means of possible off-odors, when the samples were judged in the presence of several control samples. In fact, milk placed in a saturated atmosphere of certain odoriferous food substances required prolonged exposure before the odor was perceptibly absorbed by the milk. Other experiments have shown conclusively that odors quickly pass through the body of the cow into the milk before it is drawn, and not directly from the surrounding atmosphere after it is drawn, as commonly believed. The fact that odors are not readily absorbed after the milk is in the pail is no excuse, however, for letting the milk stand around the stable while the chores are being finished. The milk should be on its way to the cooling tank right away after milking.

When, How and to What Temperature Should Milk Be Cooled?

As each can is filled, the cover should be put on tightly and the can set into a cooling tank with sufficient water, or ice bank to bring the temperature of the milk down to below 50° F. Stirring is not necessary. In fact, the stirring rod has no place in modern milk production.

The urge to let the cover stand ajar for "the animal odors to escape" and thus prevent development of so-called "smothered" flavors has no scientific backing. Research has shown that when milk is properly produced in a

well ventilated atmosphere that the milk can be cooled safely in a closed container with no resulting off-odors. There is no substitute for prompt, adequate cooling.

What is the Trend in Milk Houses?

The milk house is just as essential in milk production as a stable. Here the milk may be cooled, stored and the utensils connected with milk production washed and sanitized. Much improvement has been made in milk house construction, equipment and location in the past few years. Out of the thinking has come the realization that the milk house should be accessible to the barn, of convenient size and have facilities for heating the wash water. Unless these features are to be had the milk house cannot serve the purpose for which it was intended.

Precaution should be taken to locate the milk house close to or adjacent to the barn, have it big enough, and equip it with some form of available safe heat, such as bottle gas. Mistakes were often made in early milk house construction in making the milk house as small and inexpensive as possible, and then locating it near the house where it could not be used as intended. Since the average dairyman is in the business not for the sale of breeding stock but for the sale of milk, he needs an adequate milk house for the handling and protection of his product. Modern milk production will be satisfied with nothing less.

Is Refrigeration of Milk Overemphasized?

Not at all. Adequate refrigeration is the must in modern milk production. Cooling should be sufficient to protect the milk against bacterial decomposition and not merely to retard their growth sufficiently that the milk still will be acceptable at the receiving station. With rural electrification will come greater use of the electric cooling tank with its daily ice bank available for reducing the temperature of the warm milk quickly to a safe temperature for storage. This is probably the ideal in milk cooling and storage. Regardless of the means, milk must be adequately cooled.

What is the Secret of Pest Control?

Pests, flies, roaches, ants, mice, are still a problem in clean milk production, particularly during certain seasons of the year. They must never get into milk in the first place or around the utensils in which the milk is to be handled. While a lot of enthusiasm is being shown today toward DDT and some of the new rodent poisons, the dairyman must get out of the fly-and-rodent-catching stage, commendable as this is. He must practice good housekeeping in

and about the stable and milk house, thus eliminating the breeding places. With good housekeeping, which involves utmost cleanliness, flies will not want to come into a stable and milk house.

Are There Any Short Cuts to Cleaning Utensils and Equipment?

Dairy utensils, pails, milking machines and all should be washed after each use as a part of regular milk producing procedure. However, with new types of washing compounds this is not a tedious scrubbing task as heretofore. In the new methods of washing, resulting from research studies by Professor Jensen, Michigan Agricultural Experiment Station, the utensils can be given an excellent washing with a minimum of time, labor, water and cleaning compounds. Furthermore, after weeks of such washing there is no build-up of milk stone.

Teach Calves To Eat Grain

Condensed from The Southern Planter

If you plan to creep feed beef calves this year, take this tip and top the fat calf market next fall—select well-bred, typy calves out of your best cows and teach them to eat grain before they go on pasture. It is wise to start with early calves, those dropped in January, February and March.

Calves of this age, out of the right kind of cows and sired by good bulls, will be 10 to 12 months old when sold in early winter and, if properly handled, will weigh 700 pounds each. The heifer calves will sell along with the steers, without discount. The fat calf offers the stockman a quick turn-over of his capital and a grain-fed beef animal at minimum cost.

Creep feeding doesn't fit all farms. Feeding grain in creeps is only a means of keeping the calf on full feed all spring, summer and fall. When heavy milking cows and a superabundance of good pasturage are available, creep feeding may not prove profitable. West Virginia University, through carefully conducted experiments, has proved this. But where pastures tend to go back during droughts, or where beef cows fall off in milk production, the feeding of grain in creeps pays handsomely. Dr. E. A. Livesay, in charge of these tests, has summarized them as follows:

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1. It usually will not pay to creep-feed calves if the breeder has good pasture throughout the grazing season and his cows are good milkers.

2. It usually will pay to creep-feed calves, if the breeder has fair to poor pastures, or cows which are fair to poor milkers, or a combination of the two conditions.

3. It usually will pay to creep-feed calves any bad season. A drought may make a good pasture a poor pasture in a few weeks.

4. It usually will pay to creep-feed if the pasture is fairly heavily stocked.

Start the calves on feed around the barn when 60 days old and they will consume 10 to 15 bushels of corn by weaning time. Shelled corn, supplemented with oats and protein concentrates, is best for calf feeding. Ground barley can replace corn, pound for pound. Many stockmen are using the following feeding schedule with splendid results:

Age of calf	*Grain Mixture*
2- 3 months—	2 parts shelled or coarsely crushed corn
	1 part oats
3- 5 months—	8 parts shelled corn
	1 part cottonseed meal
5-10 months—	10 parts shelled corn
	1 part cottonseed meal

Just as important as creep feeding is getting the calves off to a good start in late winter. This means feeding the brood cows better—giving them silage, hay and some grain in winter to enable them to maintain flesh, produce strong calves and give lots of milk. Don't let the cows lose weight in winter. Well-fed cows breed better and give bigger calf crops.

The creep should be located in the pasture on ground that is well-drained near a watering place that the cows and calves visit often. An ideal place is in the shade near the watering and loafing place of the herd. If a salt box is placed near by it will cause the herd to spend more time in that vicinity.

The creep may be made of boards, woven wire, or poles and should be made from 20 to 40 feet square, with openings 18 to 20 inches in width and 36 inches in height, on the sides, or at the corners of the enclosure. Make the openings large enough to let in calves, but small enough to keep out cows.

The Pinon

Condensed from Agriculture in the Americas

Elizabeth G. Maguire

SEVERAL years ago the rescue by airplane searchers of a group of Navaho Indians trapped without food or shelter by a blizzard in the mountains of New Mexico caused widespread interest. Neither the spirit of adventure nor the pleasure of a day's outing had lured the Indians to the mountains, but a regular journey to the forests to harvest an important item of food known as pinon nuts.

These little nuts, also called Indian nuts, pine nuts, and *pinones,* are the seeds of pinon trees, the only conifers in the Western Hemisphere that produce edible nuts of any importance commercially. Scattered thinly over thousands of square miles in the semi-arid regions of the Southwest and into the mountains of northern Mexico, these small spreading pines have been serving mankind for centuries. Many specimens of the nuts and objects made from pinon wood with its gum have been found in the rock shelters and amidst the ruins of the lands inhabited by the Basket Makers, those forerunners of the Pueblo civilization that flourished in the great terraced houses of a few centuries later.

Today the nuts are considered a great delicacy by Mexicans and people all over the United States. The tree provides excellent firewood and is used for fence posts, railroad ties, and charcoal. No other use, however, is as important as that of its seed for food.

Of the four species of pinon trees the *Pinus edulis* is the most productive. This tree bears incredibly large quantities of nuts every 5 to 7 years and smaller yields annually. It thrives in nearly all sections of the pinon forest range. *Pinus monophylla,* a single-leaf pinon found chiefly in the western part of the range, bears abundantly nearly every year. The Mexican pinon, *Pinus cembroides,* is widely distributed in Mexico but does not extend far north of the international boundary. The nuts are gathered and eaten on a large scale in Mexico. A four-leaf pinon, *Pinus parryana,* of little commercial importance, grows at high altitudes in southern California and northern Lower California.

The trees thrive at elevations of 5,000 to 8,000 feet, occasionally

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even 9,000, on moderate or on steep mountain slopes and over broad levels of sloping mesas. The best stands are found on coarse gravel, gravelly loam, or a coarse sand 5 feet or more in depth on which humus and ground cover are entirely lacking. Sometimes they grow on rocky areas where the soil is only 6 to 12 inches deep. The pinon is a hardy tree, more resistant to severe climate and disease than most of the conifers with which it is associated.

Harvesting begins as soon as the cones are opened by the first frosts and continues through the winter, as the snows remain only a short time on the sunny slopes. Large quantities are picked from the ground or found stored away by squirrels, but many of the cones are knocked from the trees with long poles and caught on tarpaulins spread below. Principally women, children, and old men engage in the industry. Each cone contains 2 to 30 seeds, with an average of 10 to 20. These seed-nuts average less than a half inch in length and run approximately from 1,200 to 2,000 to a pound. They are sold to local dealers by the *almud,* an old Spanish measure of 400 cubic inches containing 11 pounds. Two of the measures, or 22 pounds, are considered a good day's gathering, though some persons have gathered 40 pounds.

Besides being superior in richness and flavor, pinon nuts rank high in food value. According to food analysts a pound of unshelled nuts from the *Pinus edulis* tree contains more energy than an equal amount of most other nuts on the market.

Merchants, dealers, and native gatherers look forward to the coming of an abundant seed year and eagerly watch for signs of the approaching harvest. In 1936, a year of great abundance, the crop of pinon nuts harvested and sold in the States of New Mexico and Arizona was estimated at more than 6 million pounds. One small New Mexican town alone shipped 8 carloads, each containing 40,000 pounds.

Wartime conditions affected the industry. Many dealers report that the nuts disappeared from their counters nearly 3 years ago. At the present time, efforts are being made to restore the nuts to the markets, especially in the East, where they had become increasingly popular. Soon again delectable cakes and candies will be filled with the enticing flavor of *pinones,* as the Mexicans like to call them, and mounds of delicious ice cream will be topped with the nutritious little kernels.

The Eye of the Master

Condensed from The Shorthorn World

Dr. Carl W. Gay
Ohio State University

THE early editions of Henry Morrison's "Feeds and Feeding" carried this quotation on the flyleaf of the book, and doubtless many have read it without catching its full significance.

The agricultural experiment stations and other investigators have so enriched our knowledge of chemistry and physiology as they relate to nutrition, that the care and management of livestock has become a very technical practice. This is as it should be with full advantage being taken of the advances made possible by our increased knowledge of the sources involved.

In this scientific development of a more technical system of feeding there has been noted a tendency, on the part of some stock men, to work toward a more abstract system of feeding, conforming closely to the rules established by the feeding standards and giving less and less thought to the personal element, the skill of the feeder himself as an item of success. But so much depends upon this man factor in a successful feeding operation that it is regrettable that the cultivation of this skill has not kept pace with, rather than yielding to, the improvement in the general practice of feeding. A few examples may help to clarify the issue.

By the rules and feeding standards, a 1200-lb. cow giving 30 pounds of 3.5 percent milk will require 2.14 pounds of digestible protein and 18.29 pounds of total digestible nutrients. This so-called rule of thumb feeding is more applicable in the case of dairy cattle than in meat animals, but even here best interests are not served by making all computations in the office and never visiting the cows. Individual cows may present individual problems that do not fit the rule. They may require individual attention for greatest efficiency.

When T. S. Cooper used to dominate the Jersey cattle business with his Decoration Day auctions in Pennsylvania, much of the favorable comment on the cattle in his offerings related to the fitness and bloom in which he brought them out on sale day. It is told how, in the final days of preparation, he regularly made inspection tours through the

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stables at night to note how the cattle were doing. He was quick to discern any evidence of restiveness or discontent on the part of any cow. To one he would say a quieting word, to another, a gentle pat on the neck, while a third might receive a few slices of carrots which he always carried. These cattle were all amply and judiciously fed, but some took more than merely ample nutrients for their maximum condition—an extra special something for the extra special bloom which would enhance their values on sale day.

In contrast, there is the case of a liveryman keeping 100 head of horses in those old days, who, upon receiving a carload of oats would reduce the carload to pounds, then figure how many days at 12 pounds per day per head the car of oats would last 100 horses. A typed notice was then handed to the stable boss to be posted on the oat bin, to the effect that this car of oats was to last until such a date and that the foreman would be held responsible for any shortage.

This action was all right as a guide to when the next car of oats should be delivered, but it is altogether too matter-of-fact a practice for the successful feeding of livestock which requires flexibility, with give and take to and from certain animals. This liveryman never saw his horses fed and did not know that some were trying to kick the stalls down because they were short of work, while others were falling asleep on the floor from sheer exhaustion resulting from long hours of hard work. Enforcement of such a system was wasteful of feed, although believed to be an economic measure, and very ineffectual so far as the well being of the horses was concerned.

The point is that the ultimate in livestock achievement can never be attained without the skill and master stroke of "the man behind the cattle" (horses, hogs or sheep). Just as some feeds, like linseed oil meal, bran and molasses have a conditioning effect quite separate and apart from their nutritional value, so fitting of livestock or feeding, in the meaning of its use here, implies more than merely meeting an animal's nutritive requirement. Even though given access to feeds in unlimited quantity and in widest variety, the feeder who lacks the "eye" will fail to obtain peak results, while some contemporary, though deprived of such a wide selection of feeds, will nevertheless make out fairly well with the materials at hand, meager though they may be because he uses his "eye" in addition to feed stuffs in the fattening of his cattle.

Feeding, therefore, is not only a science based on chemistry,

physiology and the laws of nutrition, but it is also an art, accomplished by the consummate skill of the master feeder. There are a lot of things one can learn about the science of feeding livestock, but the art is difficult for the novice to master. Natural ability plays a most important part in acquiring the all important "eye," the artistic thing that capsheafs a succeessful feeding performance.

The case it is desired to make is well illustrated by the comment of Sam Johnson, an English cattleman well known to the older generation, who was herdsman at the Iowa State College when Shamrock, an Angus steer, won the International Grand Championship in 1902. After Sam's triumphant return from Chicago, he was invited to tell the Animal Husbandry students the story of the making of a grand champion. He was getting on real well when some student, evidently fresh from the classroom and a feeding textbook asked—"How did you balance his ration?" Sam looked perplexed for a moment, then made this very significant reply—"The steer balanced his own ration." That statement is, in effect, another way of stating the title of this article. It is not likely that Sam Johnson had had much to do with the mathematics of balancing a ration, according to the feeding standards and nutritive ratio, but he did know his cattle, and it is a perfectly safe assumption that had the ration he fed Shamrock been checked with the book, it would have been found to be balanced according to the accepted feeding standards. What then was the great significance of the statement that the steer balanced his own ration? Simply this—the "eye" of the master (and his nose, too) made certain determinations concerning the steer being fitted by which the adequacy and make-up of his ration were measured and both the quantity and quality of his feed were altered as certain indications presented themselves. For instance, the odor upon entering the stable, the character of the droppings, the keenness of the steer's appetite, the way he was resting, the bloom of his hair coat, the luster of his eye and the consistence of his fleshing, all had a meaning to the practiced "eye" of his feeder. Of course the free choice method of feeding from a self-feeder arranged in compartments containing different feeds and supplements is another way of letting the steer balance his own ration. But that was not the method implied by Sam Johnson's remark. In this instance all corrections and adjustments were made by the feeder acting upon signs and indications of which the steer himself was the subject.

The ability to read these signs aright is the real measure of the

skill of the feeder and by his intelligent interpretation of the signs as he read them, Sam Johnson arrived at about the same conclusion as to the steer's requirements and compounded about the same ration to meet them as would have been calculated by the established mathematical formulae based on the mass of experimental data accumulated by the experiment stations and other investigators. But the "eye of the master" system not only meets accurately the full nutritional requirements, as does the mathematically calculated ration, but it has the additional advantage of providing an individual ration of special adaptability to bring out the utmost in the animal's individual response while the balance by the book system has only a blanket or an overall application.

This discussion is not intended to detract from the importance and usefulness of the feeding standards but rather to show how to make the best use of them by supplementing them with those extra special practices which the skilled feeder understands so well and upon which the difference between just another feeder and a master feeder may depend. If he is to attain the ultimate in feeding livestock, he must top off the practice of the basic scientific principles of nutrition with the finer artistry by which something more than merely the basic nutritional requirements are to be met. He must keep his eye on the indicator, learn to read the indications accurately and then cater to the special requirements, even to the whims and fancies of the animals he is fitting. He must cultivate the "master eye" as an important aid to fattening.

Emergency Chick Greens

The poultryman who has no legume pasture for young chickens may well seed a mixture of rape and winter wheat early in spring, D. C. Kennard, Ohio Experiment Station, says. Wheat that comes up after the last freeze of winter is not likely to joint, but it makes considerable green growth and will supply grazing until rape is ready.

"Some poultrymen will hesitate to seed rape, believing it is not good for chicks," Kennard said. "Both rape and cottonseed meal have obtained bad names because they are objectionable for laying hens. However, they are both good growing feeds and they may well be used."

Capper's Farmer

One-Year Leases Mean Soil Mining

Condensed from Farm and Ranch

Otis Durant Duncan
Oklahoma A. & M. College

All the available information shows that, as a rule, farm tenants move much more often than owners. In 1940, when the census was taken, about 22% of the farm owners and 63% of the farm tenants of the United States had lived on the farms they occupied for four years or less. However, 33.2% of the tenants and 7.7% of the owners had been on the same farms only one year or less. At the upper extreme, 48% of the owners as compared with only 9.4% of the tenants had been on one farm for fifteen years or longer.

Between 1930 and 1940, the mobility of both tenant and owner farmers slowed down greatly. In 1930, 50.7% of the farm tenants and 10.7% of the owners had dwelt on their last occupied farms for one year or less, while only 5.5% of the tenants and 42.6% of the owner farmers of the United States had been on their then occupied farm for fifteen years or more.

With the exception of the delta and coastal regions and other areas having peculiar natural protection against various forms of erosion, sections of the United States having high proportions of farm tenancy also have severe soil erosion. This is not to say that farm tenancy causes soil erosion. It is that the forms of farm tenancy found in most sections of the United States lack the necessary characteristics needed to check effectively the erosion of the land and to maintain its productivity unimpaired.

Since from a third to one half of the tenants stay on a farm one year or less, and nearly two thirds of them for only two years or less, it is impossible for the typical tenant to have a long-time interest in preserving the land he farms. His main concern is with year-to-year cash returns, and seeks the ways in which he can get the greatest possible quick returns from his land, leaving to his successor the task of maintaining and rebuilding the soil.

The owner with land to rent wants the largest possible yearly cash return from it. More often than not, therefore, the owner seeks a tenant who will grow

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only cash crops. The type of farmer who is interested chiefly in short-time cash returns often prefers to rent the land he uses because renting fits into his philosophy of cash farming. The tenant who wants to grow soil-building crops will shift from a rented farm to one of his own. But insisting upon exclusive cash crop farming, the owner becomes a conspirator with the tenant in the crime of soil mining.

Everything possible should be done to lengthen the tenure of operators on farms, and this involves directing the national agricultural policy toward certain definite goals.

First, we should strive to increase the relative number of farm owners when, in view of all other considerations, it seems most expedient. This can be done by a further extension of a sound tenant purchase plan, by the extension of private credit, and by cultivating a desire on the part of the tenant to become an owner.

Second, owners are recruited largely from tenants. Therefore, the number of moves a farmer must make prior to becoming an owner can be reduced if steps are taken (1) to lengthen the period of occupancy; (2) to liberalize the lease contract so as to give the tenant adequate compensation for his part in carrying on a soil-building and -conserving program on the farm he uses; (3) to compensate the tenant for unexhausted improvements placed on the farm at his own expense.

Third, there are conditions under which tenancy is equally as satisfactory a stage in land tenure as ownership: (1) When the tenant is the potential owner by inheritance of the land he operates; (2) when the tenant is desirous of keeping his investment in the form of operating capital rather than fixed in land, and when he does not want to assume the risks and fixed costs incident to ownership; (3) when the tenant may lack certain managerial qualities necessary to ownership and may be able to work better with than without supervision; (4) when there are other peculiar elements in the situation such as public ownership of the land.

Under such conditions as those enumerated above, differential rental contracts providing for stabilized tenure, proprietorial rights in improvements, and specific rentals for different types of crop and livestock enterprises rather than flat rental charges should be arranged. Thus, the tenant would pay and the landowner would receive the true economic rent for the land capitalized on the basis of its agricultural productivity rather than upon its speculative value.

Fourth, both owner and tenant

operated farms should be graded, classified, and sized so as to constitute economic family farm units, thus reducing the temptation to move in search of larger farms better suited to the family needs. The authorities controlling publicly owned farm land, the Indian Service which supervises the leasing of restricted Indian land, investment companies, other corporate owners of land, and large individual land-owners should take the lead in this respect and see to it that no uneconomically sized farm unit is either leased or sold to a prospective farm operator. Legislation also should be provided to govern the sale and subdivision of land in this regard. Credit agencies should direct their loan policies so as to guarantee that the farm purchases financed by them will be economic units.

Fifth, we should endeavor to set up a national economic organization for agriculture capable of (1) maintaining the family in state of good health generally, (2) giving children educational and social advantages equal to the needs of their times, (3) insuring the aged against want and dependency in retirement, and (4) passing the land to its next occupant with its productive powers unimpaired. This is a necessary minimum goal which must be achieved if American agriculture is to endure. This would enable the ambitious and energetic young farmer, whether tenant or owner, to maintain the traditional "American standard of living" on the farm without being compelled to move every time a new baby is born.

If the remedies suggested are applied effectively to the problem of high mobility, much of the evil of farm tenancy as it is related to the dissipation of the soil will be removed. Tenancy in its present form does not afford the tenant a sense of permanence on, or of belonging to, the land; therefore it does not invest him with a determined incentive to conserve soil properties. Since this fact is known and since it is within our power to stabilize greatly the occupancy of farms by tenants, it follows that the ravages of the land which grow out of transient occupancy can be controlled in a large measure through the stabilization of tenure for tenants, and for owners as well.

Unique Agricultural Foundation

Condensed from Iowa Farm Economist

Francis A. Kutish

THE proof of sound farm management is in the profits.

A 60 percent jump in crop production in 7 years, a 554 percent climb in livestock output and a 265 percent increase in farm profits with no increase in the amount of labor used is a farm management record any farmer would be proud to own. That's the record of 7 years of operation by the Iowa State College Agricultural Foundation of a group of "distressed farms" it took over in 1937.

The Iowa State College Agricultural Foundation is unique in more ways than one. It represents the first time a State Agricultural College has profitably operated typical farms as an educational demonstration in farm management.

In 1937 Mr. C. R. Musser of Muscatine, Iowa gave nine Iowa farms to the Iowa State College. He asked that these farms, which were carefully selected to represent each soil type problem area of the state, be used to make a social and educational contribution to the improvement of agriculture in Iowa. He gave an additional sum of money, large enough to make sure that they could be used for this purpose.

The Iowa State College, in turn, set up an "Iowa State College Agricultural Foundation" to put these "distressed farms" on a paying basis in such a way as to hold the respect of local farmers. The Foundation in turn appointed James J. Wallace, manager, to work with the tenants in developing management programs for the farms.

Mr. Wallace was instructed to work out practical farm practices and operations—only those such as could be adopted by a large proportion of the neighbors who made their living from farming.

Everyone concerned realized that the Foundation had staked out a pretty big job for itself. They wanted all the help they could get. So in each county where one of these farms was located, local advisory committees composed of farmers were selected to advise with the Foundation on the operation of that farm.

Once the advisory committees had been selected, Mr. Wallace set out to visit the farms. He found the tenants uncertain about their attitude toward the Founda-

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tion. Many farmers in these communities were frankly skeptical and suspicious of ideas coming from the Iowa State College.

Mr. Wallace also found the farms in bad shape. Those in southern Iowa were hilly and covered with growing gullies. The pastures were unproductive. Only a few acres were seeded to soil building legumes. A large share of the land had been put to corn and oats and the soil was "run-down." Valuable manure was being wasted. The northern Iowa farms were badly infested with weeds and needed better drainage.

The buildings on all of these farms were in poor condition. Roofs leaked. Foundations were collapsing. Plaster in the dwellings was falling. Fences were ineffective. Water systems were unsanitary and inadequate.

So much needed to be done that it was hard to tell where to start.

The first year was largely spent in repairing and painting the buildings; some liming was done; and a start was made on attempting to control gullies. Both the Foundation and the tenants agreed that it would be best to hold off the rebuilding of fences until more time could be spent in mapping out the best field arrangements.

The tenants in turn, as their part of the program, agreed to use some hybrid seed corn for the first time. Each family began to keep a farm record book that covered the farm business as a complete unit. It included a monthly feed record which was checked against stocks of feed on hand twice during the year. This gave the tenants a good measuring stick of the results they were getting from different kinds of livestock.

Before long both the tenants and Mr. Wallace were getting some good clues from these farm records to follow in their joint efforts to put the farms on a paying basis. For one thing, the financial study of the farm records at the end of the year showed clearly the "low earning power problem" on those farms located in the southern part of the state. Property taxes were high compared with the producing power of the land. Crop yields were very low. The farm operators themselves were short of money and did not want to take the risk of borrowing what credit was available to them.

The year 1939 saw the tenants and the Foundation tackling in earnest this job of boosting farm income. More of the land was limed and legumes were given a definite place in the cropping program. A good grass mixture of alfalfa, clover and timothy was used to get more land in grass. Some phosphate was tried out to see what it would do.

Mr. Wallace encouraged the

tenants to secure the use of a good manure spreader to get the manure out on the land before plowing for corn. This source of fertilizer had been badly wasted.

One of the problems brought out by a study of the farm records was the small size of business on most of these farms. "Volume" or size of business is one of the important reasons deciding the amount of profits on a farm. The records kept by the tenants showed these farms to be weak on this count.

Mr. Wallace and the tenants talked the matter over. How can we step up the size of our farm business without renting more land, they asked themselves. Finally, all agreed that the best way was to raise more livestock. Several of the farms were therefore switched from a crop share to a livestock share renting basis to get more livestock on the farms.

But that soon brought them smack up against another problem. The buildings on many of these farms were not in proper shape to handle a larger livestock program. Revamping the farm buildings to handle more livestock proved to be a tough problem. The Foundation had to get answers at once to the question: How great an investment in buildings can be justified for each farm on the basis of "good business?"

Finally Mr. Wallace and the tenants reached a decision about which buildings to keep on each farm. Buildings that were to be kept were put in good repair and given two coats of paint. Few new buildings were put up.

During 1940, the third year of the Foundation, the lime and legume cropping program went ahead on these farms with varying degrees of success due to usual hazards of weather. In general, the pastures were providing more feed for the livestock. Alfalfa was growing on land which formerly raised only timothy seed.

The tenants were all using hybrid seed corn by this time. More of the feed crops raised were fed on the farms instead of being sold for cash. Barnyard manure was effectively put back on the land.

By this time Mr. Wallace and the tenants had a definite plan of attack going ahead on the gully program on those farms subject to this hazard. Where gullies had formed on land with little crop or pasture value, black locust trees were planted and protected from livestock. On land with some value as pasture, the gully land was seeded to a nurse crop of rye with a mixture of timothy, lespedeza, bluegrass and redtop.

Gullied land, which they agreed in time should be cropped in a regular rotation, was given a more thorough treatment. The ditches were plowed in to give the

water course more width. Every so often dams were built with sod and sacks of dirt which were seeded to a grass mixture. Then the whole waterway was seeded to a mixture of clover, alfalfa, timothy, bluegrass and a nurse crop. After a new seeding had been thus established it was not plowed or disked again.

Mr. Wallace liked this plan because it called for no high priced dams. The tenants liked it because it left nothing to bother machinery crossing the water course. The heavy part of the work was done by the tenants at times when they were not at more important tasks.

A start was made in contour farming of all areas subject to erosion. And where needed, buffer strips of grass were established.

The Foundation entered into a livestock-share lease with those tenants who seemed to have the ability to follow a sound livestock program. This new leasing arrangement made it profitable for the Foundation to buy more livestock equipment. It also cut down the risk for the tenant and enabled him to further step up the size of his business.

The Foundation next decided to try to get their tenants to think as much like owners as possible. This was done by encouraging and helping each tenant family to make their farm home and farmstead a more desirable place to live. Fencing and grass seed were provided for the improvement of lawns. With the aid of an extension specialist, a landscape plan was set up for each farm. Some shrubs and trees were bought for the tenants. A prize was offered to the family showing the greatest progress.

Then the Foundation entered into a five-year lease with each of the tenants. The lease in every case contained a clause that gave either party the right to end the agreement by giving proper notice before September 1 of each year.

The tenants were told they could remain on the farms as long as each family did a good job of farming. This seemed to give the tenant operator the right amount of security of tenure. He also realized that it was to his interest to continue doing a good job of farming. It appeared to provide an inducement for self improvement.

Perhaps by this time the question has occurred to you "How did this all come out on a dollar and cents basis?" A glance at the table will show how the profits were going up at the same time.

The "volume" or size of business on all farms grew sharply during 1942. This increase in size of farm business came at a very good time due to the rise in price levels. The combination of more farm output and higher prices brought a sharp jump in farm

Financial History of First Nine Foundation Farms Operated by Iowa State College Agricultural Foundation

Area		Cash Grain		Southern Iowa			Southwest Iowa				
	Year	160A	160A	120A	176A	235A	160A	250A	320A	160A	Total
Landlord's	1938	$ 324	$ 136	$ −41	$ −96	$ −82	$−157	$ 102	$ 108	$ 53	$ 346
Net Profit	1939	278	305	146	−66	−310	−189	490	264	28	1,030
	1940	612	291	173	136	−322	−284	923	736	−37	2,227
	1941	616	1,275	456	1,793	123	−247	1,024	1,910	1,071	8,025
	1942	1,530	2,229	2,162	1,439	221	96	1,550	3,093	1,007	13,327
	1943	2,767	1,525	1,826	2,315	528	351	2,029	3,665	1,655	16,661
	1944	1,089	2,373	9	117	−145	307	1,099	2,211	1,885	8,945
	1945	1,510	2,720	1,490	2,758	847	815	890	2,037	1,177	14,244
Tenant's	1939	718	703	1,109	959	709	647	1,585	1,513	991	8,934
Net	1940	760	1,552	1,201	1,376	247	939	1,556	1,979	1,412	11,077
Income	1941	632	2,014	1,715	2,637	881	1,441	1,622	2,853	2,007	15,800
	1942	2,340	3,875	4,497	3,261	1,079	2,988	1,610	3,548	1,958	25,146
	1943	3,107	2,166	3,164	3,454	1,595	622	2,297	5,410	3,133	24,948
	1944	1,950	2,735	1,567	708	1,272	720	1,732	2,016	3,008	15,708
	1945	1,918	2,838	2,626	3,760	1,499	1,578	1,546	1,417	2,137	19,319

profits for the year. The most spectacular increase occurred on one of the farms where the combined profit of the landlord and the tenant was about one-sixth more than the appraised value of that farm.

Some inbred Poland China sows were purchased from the Agricultural Experiment Station of Iowa State College. These were crossed with some Minnesota No. 1 boars, a new breed developed by the University of Minnesota. This cross was made in an effort to produce a hog that was more of the "middle of the road" in type. The litters from this breeding thus far have proven to be fast gainers with lots of length and depth.

During 1944, dairy herds were assembled on three of the farms. The tenants on these farms needed some type of livestock enterprise which would make more full use of their time and which would also make profitable use of the increased amount of roughage the land was producing.

Dairy cattle were selected because they offered an outlet for available labor and because they are very good at converting high quality roughage into profits.

The high profits of the farms during 1943 grew out of a combination of rising prices, good weather and high feed efficiency on nearly all the farms. The drop of income during 1944 was due to an end of rising prices, a drop

in some prices, higher feeding costs and lower feeding efficiency.

The lower feeding efficiency in 1944 was due largely to a breakdown of the sanitation in the hog production program on five of the farms. This represents a combination of effects growing out of increasing the number of hogs on these farms accompanied by an increase in the population of hog parasites.

The crop production increases represent real progress on some farms and not so much progress on others. But there is evidence that real progress was made in physical productivity regardless of variations in dollar returns.

The income increase of 1945 over 1944 occurred in spite of a drop in crop production. It was largely the result of increased livestock production and a higher feeding efficiency. The tenant's operating expense is increasing relatively more rapidly than the landlord's "fixed" expense. This is indicated by the fact that the net income of each is getting closer together.

Corrosion Tests Determine Wire Fence Durability

Condensed from Farm Research

B. A. Jennings

Ithaca

It is quite possible that before long, fencing, like feed or fertilizer, can be purchased on an "open formula" basis, and when this occurs, the savings to the farmers in New York State will amply pay the cost of this test work.

Exposure testing of wire and farm fencing was begun in 1936 by the American Society for Testing Materials, in cooperation with several colleges and experiment stations. This is one of the most thorough and complete tests of this nature ever undertaken.

Samples are being tested at the following places: Pittsburgh, Pa., and Bridgeport, Conn. (industrial exposure conditions); Sandy Hook, N. J. (a salt-air exposure); and State College, Pa., Ithaca, N. Y., Lafayette, Ind., Ames, Iowa, Manhattan, Kans., Davis, Calif.,

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Santa Cruz, Calif., and College Station, Tex. (rural exposure conditions).

At each site the wire under test comprises 72 samples of woven-wire farm fencing, 23 samples of barbed wire, 13 samples of standard cable, 21 samples of link fencing, and 840 samples of unfabricated wire—a total of 969 samples.

The exposure samples consist of uncoated copper-bearing steel wire, zinc-coated, or galvanized, wire, corrosion-resistant steel wire, or the so-called *stainless steel* wire, copper-covered wire, and lead-coated wire. Most of the wire samples, however, are zinc-coated. The wire varies in size from No. 6 to No. 18 gage. The galvanized coatings vary from 0.24 inch of zinc to 3.00 ounces per square foot of wire surface. Many of the samples were especially manufactured because the desired specifications or coatings were not available commercially, particularly the heavier coatings and the samples of low-copper-bearing steel wire.

The samples for the various sites were taken from the same batch of wire. Also the various fences were fabricated from the same wire used for the wire samples.

Each of 120 samples of unfabricated wire are duplicated seven times. Every sample is removed at each estimated one-seventh of its life for laboratory-testing of strength and loss of zinc.

One extra set of samples was sent to the United States Bureau of Standards at Washington for complete chemical and physical analysis.

Each college site is under the care of an agricultural engineer, who makes an annual inspection of samples, and reports for his site. These reports are summarized for all of the sites by the A.S.T.M., and printed in their annual report. Thus, one can compare the rate of corrosion for the various sections of the country.

Although these tests have been under progress for only nine years, considerable information has already been obtained. As time goes on the information will be of more value.

One of the important facts found to date is that for any given exposure condition, the rate of loss of zinc is fairly constant. Knowing this rate of loss, one can estimate how long a galvanized wire of any weight of coating will last before it starts to rust.

The rate of loss of zinc at Pittsburgh is 0.369 ounce per square foot of wire surface per year. Thus, an ordinary fence with approximately a 0.30-ounce coating will rust in less than one year. At Sandy Hook, the rate of loss is 0.150 ounce per year, or a 0.30-ounce-coated fence will last two years before rusting. At State

College and at Ithaca the rate is very similar—approximately 0.06 ounce per year. A 0.30-ounce coated fence at these sites will last 5 years before rusting. A good-quality fence with a 1.00-ounce coating will last for 15 to 16 years before rusting.

The difference in life of fencing due to the coating of zinc is especially important when the price of heavier coatings is considered. For example, an 80-rod roll of barbed wire with a 0.30-ounce coating costs $3.20; with an 0.80-ounce coating the cost is only 25 cents more, or $3.45 per roll. Based on the cost per year, $3.24 ÷ 5 years = 64 cents per 80 rods per year, while $3.45 ÷ 13 years = 27 cents, or less than half. Similar results are obtained with woven-wire fencing.

It should be noted that the above comparisons are based on length of time until rusting occurs. However, after rusting begins the wire will continue to be useful as fencing for some time.

Complete information has not yet been obtained on the life of fencing after rusting starts. Small wires lose strength much faster than do large wires. For example, at the Pittsburgh site, 14½ gage (small wire) lost 85 per cent of its original strength in 6 years, while No. 9 gage (large wire) lost only 33 per cent during the same period.

When complete information has been obtained on the loss of strength after rusting starts, one can readily determine the complete life of a fence, based on the time until rusting occurs (amount of zinc) and the time after rusting starts (size of wire).

As for the other types of wire, it can be noted generally that the copper-covered wires have not rusted, (but have become dark brown or black); the lead-coated samples have numerous small particles of rust at various places on the wire; the corrosion-resistant wires are as bright and shiny as the day they were erected.

Hand Feed Bred Gilts

Condensed from American Hampshire Herdsman

THE standard method of feeding bred sows has been to limit the grain allowance by hand-feeding. This is a logical plan because the full-feeding of corn is costly and results in some of the sows getting loaded with fat by the time they are due to farrow. There is general agreement among hog producers that about two-thirds of a full feed of concentrates is all that is necessary for pregnant sows.

Self-feeding growing and fattening pigs has become such a general practice that the possibilities of applying the method to brood sow feeding have been investigated by the Minnesota Experiment Station. The first trial was run in the winter of 1943-44 when 10 bred gilts were hand-fed and 12 similar gilts were self-fed. The hand-fed lot received a mixture of 67% ground corn, 26% ground oats and 7% tankage at a rate of feeding which would make about a pound of gain daily per sow. The average was 2 pounds of the feed mixture per day for each 100 pounds live weight of the sows. Alfalfa hay was full-fed in a rack liberally enough so that the sows would eat only the leaves and reject the stems. The gilts were about half-fat at the beginning of the feeding period and received enough feed so that two of the 10 head were rather fat when due to farrow.

The self-fed group of gilts received a mixture of 43% ground corn, 25% ground oats, 25% alfalfa meal and 7% tankage. The same mineral mixture was self-fed, separately, as supplied the hand-fed gilts. These gilts each ate approximately 1 pound more of feed daily per sow. One of the advantages of self-feeding was an increase in the consumption of alfalfa over the hand-fed group. Alfalfa hay made up 14.8% of the hand-fed ration but alfalfa meal constituted 25% of the self-fed ration.

The principal factor to be considered when comparing rations for pregnant sows is the effect upon the pig crop. Large numbers of strong pigs at farrowing time start the pigs on the road to profits when marketed. The average number of pigs farrowed per sow was 9 in the hand-fed lot and 9.7 in the self-fed lot. Nearly the same number of pigs were weaned, 6.7 and 6.67 in the respective lots and the average weight per pig was 31 pounds in the hand-fed group and 32

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pounds in the self-fed group. The differences between lots were so small that no advantage could be established for either of the two methods of wintering the gilts.

The two methods of wintering bred gilts were followed again in the season of 1944-45. Eighteen gilts were handled and 16 self-fed on rations similar to those fed the first winter.

While the rations for these two lots of sows were not exactly alike, the same feeds were used in a little different proportions. The hand-fed gilts were limited in the amount of the grain mixture which consisted of 67% ground yellow corn, 26% ground oats and 7% tankage. Two pounds of feed were allowed for each 100 pounds liveweight of the sows. All the alfalfa hay that the sows cared to eat was kept before them in a rack. The total feed per day amounted to 6.9 pounds per sow.

The self-fed group having access to feeds at all times ate 8.6 pounds of feed per sow, daily. The mixture consisted of 44% ground yellow corn, 25% ground oats, 25% alfalfa meal and 6% tankage. The mineral mixture fed to both groups was in separate self-feeders and was eaten at the same rates, .01 of a pound daily per sow.

At the time the sows were due to farrow, a rating was made as to whether they were thin, medium in fatness or fat. In the hand-fed group, two sows were considered thin, one fat, the remainder in thrifty, desirable condition. In the self-fed group none of the sows was thin, one was fat and the remainder medium in fatness. Neither method of feeding resulted in all sows in a group having exactly the desired condition. The hand-fed sows gained 114 pounds each during the winter while the self-fed sows increased in weight 151 pounds.

While suckling their litters of pigs the hand-fed sows lost 32 pounds in weight on the average and the self-fed sows lost an average of 48 pounds each. When the pigs were weaned the self-fed sows still weighed an average of 27 pounds more per head than the hand-fed sows. At market prices of hogs, this greater weight more than covered the higher cost of wintering the self-fed sows.

The real test of the values of rations for bred gilts is the pig crop which is raised. But it must be remembered that many other things besides the ration fed during pregnancy affect the numbers and weights of the pigs weaned. Conclusions must be made conservatively and only after several years of study. The results from the second year of this experiment are less favorable to the self-feeding plan than was the case the first year. The hand-fed sows farrowed an average of 9.4 live pigs

per litter while the self-fed sows farrowed 9.1 pigs. The birth weight per pig also was slightly higher in the litters from the hand-fed sows, 2.70 pounds as compared to a weight of 2.64 pounds from the self-fed gilts. These differences are so small that little emphasis should be given them.

In number of pigs weaned per litter, the hand-fed sows showed a clear advantage, 8.5 as an average compared to 7.4 from the self-fed sows. The loss of pigs from farrowing to weaning time was almost twice as high in the litters from the self-fed sows as in those from the hand-fed sows. This was not due to the self-fed sows being fat and clumsy because the losses from pigs injury by the sows were low in both groups. The strength and vigor of the pigs when farrowed were nearly the same in the two groups.

The pigs from the hand-fed group of sows were heavier at weaning time by four pounds each than those from the self-fed sows. It is difficult to assign any specific reason for this difference because the pigs in both groups were unusually free from diseases affecting nursing pigs.

The results reported here favor the hand-feeding of pregnant gilts in the numbers of pigs and the weight of the pigs at weaning. Many other factors in addition to the ration fed during gestation have a part in the results. For this reason it is not safe to conclude that the problem is fully answered. More work will be done to attempt to find out how each of many factors affecting pig crop vary from season to season.

Managing Sheep for Greater Returns

Minnesota farmers have found that farm records were a help to them in getting greater financial returns from their sheep.

A study of farmers' records indicates that efficient utilization of feed has a decided influence on returns from sheep. There was a considerable variation among the farms in the amount of concentrates fed and in the utilization of waste feeds.

Flocks lambing in March were the most profitable. A large lamb crop and a low death loss are essential. The average death loss varied considerably among farms and had a decided bearing on the return over feed received per head of the sheep in the flock. The highest return over feed was secured when the lambs were marketed in September and October.—*From Minnesota bulletin "Managing Sheep for Greater Returns" by T. R. Nodland and G. A. Pond.*

Iowa Farm Economist

Record of British Countrywomen

Lady Denman

Chairman of National Federation of Women's Institutes

In 1897 Mrs. Hoodless, a Canadian farmer's wife, formed the first Women's Institute at Stoney Creek. Soon the movement was recognized by the Provincial and Dominion Governments of Canada. In 1915, the first Women's Institute was opened in Wales. Now in 1945 there are nearly 6,000 Institutes, with 300,000 members, in England and Wales. In fact, Britain's National Federation of Women's Institutes is now the largest organization of countrywomen in the world.

The aim of the W. I.'s is to improve and devolop rural life educationally and socially. Institutes are formed in villages and small towns with less than 4,000 inhabitants. They are non-sectarian, non-political and completely democratic. All members pay the same subscription, have the same voting rights, elect their own officers and choose their own programs.

The squire's lady and the butcher's wife are on the same level in a Women's Institute. Members wear no uniform but have a badge bearing their motto, "For Home and Country."

Today the Institute movement has spread all over the United Kingdom and the British Commonwealth and Empire; there are Institutes in Scotland, Northern Ireland, Canada, Australia, New Zealand, India, Rhodesia and Nyasaland.

Recently Frenchwomen have been sent by the French Government to tour our Institutes and to attend Organization Schools with a view to starting W. I.'s in France, and there have been enquiries from Poland and Holland.

The variety of war work that W. I. members, as country housewives, have been asked to do by Britain's Government, is enormous. Ten Ministries asked for their help, and got it. In five years made 4,361 tons of full fruit jam for the civilian ration at village preservation centers, organized on an entirely voluntary basis. Fruit came from cottage gardens and from hedgerows.

To help women and children in Russia, W. I. members made over 2,000 fur-lined coats, hoods, gloves, mittens, and waistcoats, chiefly from the fur of rabbits bred in their own gardens. They knitted up nearly five tons of

colored wool in eight months to clothe the shivering children of liberated Europe, at a time when wool for their own needs was not easily obtainable. When there was an S.O.S. for potato baskets from the Ministry of Agriculture, they made 2,500 of these, though none of the members had ever tackled such work before. To combat a shopping basket shortage they made baskets from hedgerow materials such as clematis and honeysuckle. Middle-aged W.I. members waded out into the sea up to their knees off the Cornish beaches picking up seaweed off the rocks because it was needed for medicinal purposes, and every summer members have been out in parties to pick up tons of rose hips, foxglove seeds, nettles and belladonna (deadly nightshade) to be made up into drugs and tonics for Army hospitals.

In order to save fruit and vegetables in village gardens from going to waste, markets in villages and small towns were organized before the war. During the war years these increased to more than 300, with a turnover varying from $240 to $16,000 a year. Many are continuing into the peace.

British and Allied soldiers, sailors and airmen in country camps and billets were "mothered" by W. I.'s who provided them with regular hot baths, washed and mended their clothes, housed them on leave, invited them to meals and gave parties for them. Many grateful letters were sent to them by G. I.'s who found them a "home from home."

Time was found, too, for evidence to be collected from 3,500 W. I.'s on the lack of water and sewerage in many villages. Five thousand copies of a Water and Sewerage Survey were sold and public opinion was crystallized and a Water Bill was passed by Parliament in 1945. One County Federation of W. I.'s started a competition for the best pair of rural cottages and the prizewinning design has now been translated into reality.

All this work by members was undertaken in addition, of course, to running their homes, housing evacuees, looking after their children, shopping, cooking, washing and mending and helping their menfolk on the farms.

Now the war is over and W.I.'s are looking ahead. First and foremost, they are giving a great deal of thought to the return to the village of thousands of young women from the Forces and from factories, and with the problem of making country life attractive to the younger generation. A summer school at Oxford in July, 1945, debated the "Future of the Village." A one-day conference in London on "Adult Education" discussed how the N.F.W.I. could help to carry out the plans of the

new Education Act, and another London conference dealt with Home Repairs and Decoration. Plans are now being made for a residential session during the spring of 1946 when W. I. members will be able to spend the inside of a week doing practical home decoration and repairs under the guidance of exports.

Members asked for an explanation of the United Nations Charter and of the arrangements that are being made to tackle problems of world nutrition and social welfare. The day after the Charter was finally ratified and shortly before the Assembly met in London, W. I. members heard an explanation of it from experts at a two-day conference arranged in conjunction with the Royal Institute of International affairs. A special session was devoted to discussion of what countrywomen could do to help to implement the United Nations Charter.

The first Combined Arts Festival to be staged by the N.F.W.I. is to be held in the autumn of 1946. Teams, which may include men-folk of the village, will produce plays, with choirs supplying the music, and will design, make and paint their own scenery, properties and dresses. Two teams from each country will be chosen to compete at Area Festivals, and the winners at these Area Festivals will take part in a final festival in London in November, 1946.

The young country housewife, who is new to her job, may, by joining the 20,000 members of the W. I. Produce Guilds spread over 50 counties, learn to can and bottle her own fruit, plan her vegetable garden for all-the-year-round cropping, have honey from her own bees and make beeswax, look after small livestock, and cure bacon and hams.

A refresher course in plain sewing is to be given at N.F.W.I. headquarters early in 1946 for W. I. teachers in order that they may cope with the great revival of sewing and handicraft that is expected as countrywomen get more peacetime leisure. A residential school for gloving and slipper making is to be opened January, 1946, at Shipham, Somerset, to satisfy the demand for more instruction in the art of making coupon-free sandals and house slippers at home.

In fact, such a varied program is now opening out before members of any W. I., that the question so often asked by the townswoman "and what do you do in the country?" has already been changed into "and how on earth do you find time for all this?"

Soil Conservation Plane

Condensed from The Western Farm Life

P. P. Puckett

Not long ago, a former navy plane powered by a 230-horsepower motor soared over Nebraska, criss-crossed a 260-acre field several hundred times at 90-miles per hour, then landed in a nearby stubble and refilled the seeder box.

The mission was more modern than the atomic bomb, and equally as important to posterity. Jack Brown, who piloted the plane was saving Nebraska's precious top soil by seeding rye with his aeronautics. Once more, he was saving precious time. It would have taken a tractor at least a week to seed the same field—it took Jack Brown exactly 8 hours.

Soil conservation planes will soon be used by many farmers for seeding, where the top soil is inclined to blow away with the early spring winds. In a way, it's a fitting mission for the big navy planes, for our top soil is our life line, and guarding our life line is equally as important as guarding our coast lines.

It is the first time in history that a plane has been used in soil conservation work. The field was planted to beans which had not been harvested. It was important that the rye be seeded while the ground was still moist. If the farmer had waited until the bean crop was harvested, it would have required another tearing up of the top soil. Then too, the ground would have been too dry to assure a good stand. The rye was seeded in the bean field, and after the beans were cut and raked the rye seed was well covered.

Frequently, the plane has been used to seed too-wet areas, where time was short for spring planting, and the acreage would have been a total loss if the farmer had waited until he could have worked the land with a tractor or horse-drawn machinery.

The soil conservation plane is owned by Jack Brown of Torrington, Wyoming — just a few miles across the Nebraska line. Nebraska farmers have found it a great convenience to call on Jack, and a lot less expensive than owning the plane. It's a new business for a returned veteran, who has become attached to the skyways.

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New Fumigants Kill Soil Pests

Condensed from California Cultivator

Joe Crosby

Some of the outstanding results being obtained in the control of nematodes and wireworms with newly developed soil fumigants were shown Los Angeles county vegetable growers at a recent field meeting. Comparing carrots grown in untreated check plots with those raised in fumigated land, it was quite evident that the new chemicals will reduce nematode damage to a point where it is practically non-existent and increase yields and quality tremendously.

For many years, nematode and wireworm damage to California vegetable crops has run into many thousands of dollars. In some areas these pests have caused such a crop loss that some growers have ceased producing various vegetables because they could not obtain a yield large enough to break even. More often, where nematode damage is known to be severe, certain crops are planted only in the winter; the time of the year when nematodes are least active.

However, the new soil fumigants, namely, DD and Dowfume, appear to be the answers to this problem. Nearly a 100 per cent control of both bugs is obtained and one treatment may be effective for about two years. However, the chemicals have been in use for such a comparatively short time that additional trials and tests may prove that a single treatment will last for a longer period of time.

More than thirty test plots were established and the soil treated by the agricultural extension service, under the direction of Dr. P. A. Minges, who has been conducting similar experiments in other areas in the principal vegetable-growing sections of the state. He reported that nematode and wireworm control has been satisfactory in all of these tests but cautioned growers not to consider either of the chemicals as a cure-all. "They will not kill all bugs," he said, "but will give excellent results where either wireworms or nematodes are a problem."

In the first experiment the check plot produced a total of 28 pounds of topped, marketable carrots. This was very low when compared with the treated plots, where production varied from 92 pounds of carrots when one soil fumigant was applied at the rate of 56 pounds per acre, to as high

Reprinted by permission from the California Cultivator, Los Angeles, Calif.

as 148 pounds of carrots when 225 pounds of material were used.

Results obtained in the second experiment were as outstanding as in the first; in fact, they were somewhat better. A yield of 188 pounds of carrots was obtained where Dowfume W-20 was used at the rate of 40 gallons per acre. About 200 pounds of Shell DD increased production to 186 pounds. Production on the check plot, which was not treated, totaled 88½ pounds.

In all these experiments the material was applied at a depth of eight inches in the soil with a Mack anti-weed gun. Each shot contained about four cc. of the fumigant. However, in the first experiment the distance between injections varied between 18 by 16 inches to 18 by 32 inches, while in the second experiment all shots were equally spaced at 18 inches apart.

Cost of application on a commercial basis varies between $30 and $80 an acre, according to authorities at the meeting. The wide difference in the costs is dependent upon the acreage to be treated, the manner of application, the soils to which it is applied and the quantity of material used.

Various implements have been developed for the application of the fumigants on a commercial basis. The Marshburns have built a very efficient one for use on their 200-acre vegetable ranch, which has given excellent results. They have converted a new nine-foot cultivator into a soil fumigant injector at a total cost of $500, including initial price of the cultivator. It is built in such a way that the chemical flows under pressure from a 50 gallon tank on the machine, through brass tubing and into the soil. The tubing is welded to the nine chisels which are set to go eight inches into the soil and the fumigant is dispersed at that depth. It also has a roller, mounted behind the cultivator, which tends to put a firm crust over the ground and aids in preventing the chemical from escaping into the air. A small Briggs & Stratton engine is used to build up the pressure to inject the material.

Practically all persons who have used the fumigants recommend injecting them in relatively moist earth at a depth of between six and eight inches. Dr. Minges believes that the soil should be fairly well saturated with moisture at the time it is fumigated. Where summer root vegetables are to be planted, it probably would be well to apply the material soon after the last winter rains. However, he does not think that a rain immediately after it was applied would be harmful; rather it would be beneficial.

Generally, it is best to fumigate the soil from ten days to three

weeks before seeds are to be planted. However, growers have planted seed within three or four days after treatment and some experiments have been made, applying it to crops which are a month or two old. No particularly harmful results occurred from the latter method of application, but some of the plants were pulled out where it was done mechanically. The ground should be cultivated and ready for planting at time of fumigation.

The Shell Chemical Company, manufacturers of DD, and the Dow Chemical Company, developer of Dowfume, have done considerable other experimental work with their fumigants throughout the state. Dow has treated hundreds of acres of Lima bean land for wireworm control, finding that seed can be planted almost immediately after fumigating the soil.

The nematodes are so small that they cannot be seen with the naked eye and weeds and certain crops harbor them. Their presence is generally indicated by knotty, malformed or dwarfed roots. At present there is no known method of completely eradicating them. They are warm weather pests and growers of some crops have been forced to wait until winter before planting in order to obtain satisfactory yield.

Present indications are that the new fumigants will eliminate much of that problem and insure heavy production. However, Dr. Minges urged growers, who have only spotted nematode and wireworm infested land, to block off and treat those areas alone. Soil fumigants appear to be the answer to higher yields and greater returns.

Fly-Resistant Wheat

A Hessian fly-resistant wheat, long a goal of plant breeders, now appears a certainty. Scientists of Purdue University and the USDA are putting final touches on a new soft winter wheat, resistant to fly damage, as well as common rusts and smuts. Some seed will be available in 1947, more in 1948.

The fly-resistant breeding started ten years ago when a spring wheat known as W38 was found completely free of fly damage while nearby rows of other wheats were completely infested. Starting with this wheat, the researchers made crosses with disease-resistant soft winter wheats of the type raised in the central and eastern states. They had as their goal a fly- and disease-resistant variety that would yield and mill high. After hundreds of crosses and tests they made it.

Farm Journal

Deep Litter for Brooding

Condensed from Everybody's Poultry Magazine

F. H. Leuschner

Sound management of the litter on the brooder house floor can (1) save on labor, (2) cut actual litter costs, and (3) provide some degree of protection against certain diseases which afflict chicks. These things, of course, are possible only in connection with generally good brooder management.

Today, many flock owners clean their brooding pens only once during the time the quarters are occupied by any one brood of chicks. This is done when they are moved to range or to other quarters and the pens have to be cleaned and prepared for another lot of chicks. Naturally, there are exceptions, particularly if the litter gets wet or if a serious disease outbreak requires cleaning for partial control.

Deep litter brooding aims to keep the litter dry. This is done by frequent stirring of the litter and by adding small amounts of new litter material so the floor covering is about half litter material and half dry, pulverized droppings.

While the chicks are small, 1 or 2 inches of litter material is enough. But as they grow, the increased amount of droppings may contain too much moisture for that amount of litter to absorb. Then, too, when ventilation is inadequate, when floor space is crowded, when chicks are brooded in cold weather, or in cold brooding pens, or on single wood floors up on posts, the litter can become wet just as it does in the laying pens.

But in the brooding pens, there is some heat available for drying the litter. Warm air in the pens helps create greater air flow in cold weather. So the warm air, which can hold a lot more moisture than cold air, can serve as a drying agent if it has the opportunity. It has relatively little chance to do this, however, if the litter is allowed to pack. And it will pack around the feeding equipment and around the hover where the chicks or poults sleep. Then, of course, there is the spillage problem.

Frequent cleaning of wet spots is desirable not only from a disease control standpoint, but also to prevent the further waste of litter by the widening spread of the wetted area.

Daily or at least frequent stir-

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ring of the litter tends to keep it loose, so the heat from the stove and the air of the room has a chance to penetrate and dry it out. Stirring is usually a part of the morning routine of fixing fires, filling feeders and waterers, and adjusting windows or ventilators.

Frequent additions of small amounts of litter at weekly or two-week intervals help keep the floor covering clean looking and provides more absorbent material to help keep it dry. As a result of this program, it is not uncommon for a litter bed of 4 inches depth to accumulate on the floor by the time cockerels are separated. Sometimes it may reach a 6-inch depth by the time early-hatched pullets are ready for the range shelters.

Poultrymen believe, too, that it is helpful as a control against outbreaks of coccidiosis. That's something frequent litter cleaning never helped prevent. Records of the Grow Healthy Pullet Program in Pennsylvania indicate over a period of years that rearing flock mortality was no greater when pens were cleaned once or twice during a brood than when weekly or more frequent cleaning was practiced.

The floor litter mixture is somewhat of a mystery. Perhaps the service of dry litter is mechanical. Stirring does "plow under" the droppings, so only a small portion of droppings is on the surface as a source of disease. Perhaps this small source has the beneficial influence many times of exposing chicks only to the extent that nature can control or allow nature to build progressive "resistance" or immunity.

Some folks are of the opinion, too, that in a litter of this type "something happens" to the disease organisms, possibly destruction by parasites or other factors. When one of the three environmental features favorable to coccidial incubation is absent, as would be the case in a "dry" litter, then the dormant state of the organism in itself would be deterrent to infection of the chick.

Outbreaks of disease sometimes occur on fairly dry litter. More frequently flocks are observed where a few chicks show evidence of coccidiosis without the condition ever becoming a factor affecting either flock mortality or growth. And that in a fine, sturdy, even lot of chicks may be evidence that natural immunity has developed.

There are many satisfactory litter materials. In addition to peat moss, shredded sugar cane, peanut shells, oat hulls and other so-called commercial litters, locally available materials, such as shavings, sawdust, sand, fine gravel and boiler cinders, and the farm produced straw, hay, corn fodder, and corn cobs make satis-

factory litter materials when properly processed and handled.

Farm produced litter materials are better when chopped into small pieces or shredded by an ensilage cutter, chopping box or hammermill. Then they have a greater absorptive capacity, less tendency to pack, dry out more readily and, of course, can be stirred easily. Poultrymen use a potato hook, rake, scraper, hoe, fork and at first often use their feet to stir the litter. When chicks are fed grain in the litter, they usually take care of the stirring operation.

The essentials of a good litter material are:

1. Ability to absorb moisture, but be able to dry out quickly.
2. Does not pack readily because tightly packed litter does not dry out quickly.
3. Free from dust and mold.
4. Easily broken up into small pieces so it can mix well with the droppings, pack enough to give floor insulation, and small and light enough so the birds can scratch in it and keep it stirred up and loose.
5. Good wearing qualities so it lasts longer.
6. Relatively light in weight so that not too much labor is involved in handling it.
7. Economical in cost. On some farms products are used for litter that require little or no cash outlay.

Portable Hayrack

To operate his livestock farm with a minimum of hired help, Lawrence Hunter of Chandlersville, Muskingum County, Ohio, makes good use of his handy, portable hayrack. Like the many other laborsaving devices of this progressive farmer, the rack is homemade.

The rack, used by Mr. Hunter in his covered barnyard, is supported by two sections of barn-door track. In this way, it can be moved under the hay chute for filling, and then easily pushed to the center of the pen. It can be pushed from one side to the other when cleaning, so that he can drive straight thru.

The long life of the rack is attributed by its builder to the four hangers, hinged just above rack. Altho it is not of heavy material, the device is not broken by cattle bumping against it, because the hinged hangers swing with the jolt. This is a great advantage in a cattle barn.

Successful Farming

How's Your Lease?

Condensed from The Michigan Farmer

Elton B. Hill

Farm Management Department, Michigan State College

FARM tenancy is good to the extent it (1) enables both landowner and renter to profit, (2) maintains or improves the productivity of the farm, (3) maintains the farm improvements, and (4) provides for security of occupancy by the renter. Farm tenancy is bad when it does not do those things.

The farm, the landowner and the renter lose when the tenant moves. Thus every effort needs to be taken to encourage the landowner and the renter in order to provide for continuous operation of the farm. What can be done to encourage continuous and efficient operation of the farm by the tenant?

Satisfactory living conditions are essential if the renter, his wife and family are to be contented and encouraged to do their best. A good dwelling equipped with modern conveniences will attract and help keep good tenants.

The farm, however, is of first importance. It should be large enough and productive enough to provide, when efficiently managed, a farm income sufficient to divide between two families. The farm lease has yet to be developed that will satisfactorily divide the small income usually obtained from an inadequate and poorly managed farm. A good farm and good income are "musts" for successful rented farm operation.

A good lease agreement is also a help to make the rented farm a success. The usual kinds of farm leases are as follows: Landlord's Two-Thirds, Fifty-Fifty, and One-Third Crop and Livestock Share Farm Lease; the Cash Farm Lease; the Crop-Share Cash Farm Lease; and the Profit Sharing Farm Lease.

The Landlord's Two-Thirds and Fifty-Fifty types of agreements both carry blank spaces in which may be indicated the division of income from dairy and poultry products. In many cases, in the Landlord's Two-Thirds agreement the receipts from dairy and poultry products are divided on a fifty-fifty basis. In some instances, with the Fifty-Fifty type of lease the income from dairy

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and poultry products is divided 55 to 60% to the tenant and 40 to 45% to the landowner. This increased share to the tenant is the result of the increase of the tenant's farm operating costs. Farm labor and farm machinery costs, the two big cost items in the operation of a farm, have more than doubled since 1938. Taxes, interest and upkeep on the real estate, however, have not increased as much as have the other items. Thus a lease contract that was fair in 1938 may not be fair in 1946 with the important changes in certain farm operating costs.

A somewhat newer type of agreement, and one used but infrequently, is of a profit sharing nature. In this arrangement, the tenant and his wife are paid a certain wage and also share in the net returns. In this plan all expenses, including the tenant's wages and also interest and depreciation on the property owned by the landowner or the renter are deducted from the total. The balance or the net farm returns may then be divided between the landlord and renter as indicated in the farm operating agreement.

One of the least satisfactory types of farm leases, as they are customarily drawn up in Michigan, is the so-called "Crop Share Farm Lease." A more correct title for this type of lease is "Crop-Share Cash Farm Lease." With this lease the renter should pay cash rent for pasture and for building privileges and a share of the harvested crops. In some types of this lease, however, the landowner receives no rent for use of the pasture land or buildings. As a result the landowner tends to neglect his buildings, fences pasture and thus livestock farming is not encouraged. This type of lease particularly needs improvement from the standpoint of the farm, the renter and the landowner.

Rented farms are often operated in such a manner as to greatly deplete the soil. There is often a lack of understanding between landowner and renter as to the crop and soil management program to follow. Operation of many rented farms could be much improved if in making out the farm lease, the landowner and renter reached an agreement as to proportion of the land to be seeded each year, the acreage to be in soil conserving crops, the amount of lime to be applied and the amount of commercial fertilizer to be used. It is to the landowner's best interest to provide and apply lime where needed at his own expense. Cost of commercial fertilizer should be divided.

Crop yields on rented farms tend to be lower than on owned farms. Thus farm incomes tend to be less. If crop yields are 10%

less than the average, then farm incomes will be about 20% below the average. Thus it is important, if landowner and renter are to be satisfied, that soil productivity be maintained or improved in order to assure the best farm income.

Trouble Spots

The points of disagreement between landowner and renter may be few or many. Too often they concern "little" things rather than "big" things. Too often the landowner objects to paying a share of certain expenses. They forget the important question, "How can they, as landowners, help to obtain more gross income from the farm business?" It is more important to have a sizeable income to divide, than it is to argue over who pays for the share of the combine bill.

Improved landowner-renter relations are needed on many farms if best results are to be obtained. Co-operate in working out a general farm program to follow which will give best results. Then let the renter work out the details and management of the program. Many landowners wear out their welcome with the renter by abuses of hunting privileges and demands for personal services.

Some trouble is also caused by the landowner expecting to receive for his own household use the eggs, milk, garden produce and other items from the farm which he may want. On many farms this is unfair to the renter. If the farm has first to provide farm produce for the households of two families there is not much left for the renter.

Improvement is needed in the operation of many rented farms in Michigan. Improved landowner-renter relationships, more satisfactory living conditions, soil building programs, good lease agreements, a suitable farm, and good management on the part of the renter will help to improve the farm and provide more satisfactory incomes for both landowner and renter. Well kept farm records and a study of what makes the farm pay will pay good dividends.

A Control for "Moon Blindness" in Horses

News release from the Horse and Mule Association of America, Inc.

Good news for horse and mule owners comes from General R. A. Kelser, of the United States Army Veterinary Corps, to the effect that "moon blindness" (periodic ophthalmia) can be controlled through the addition of a single nutritional element to the animal's diet. This element, crystalline riboflavin, is readily obtainable and its low cost per animal, a penny a day, puts its use within easy reach.

General Kelser's announcement of the important discovery is one of the high lights of a book.

Farmers and stockmen at times have suffered severe losses through having horses or mules go blind, and the discovery that adequate nutrition will solve the problem, whether the loss of eyesight is due directly to nutritional deficiency or to a virus which operates only when such deficiency exists, is one that will be welcomed throughout the country.

General Kelser points out that the prevalence of this type of blindness among work animals, as compared with human beings, is due to differences in dietary practices.

"In the human family," he says, "we have such a markedly varied diet, drawn from so many sources, that if we made no attempt to determine what we actually need physiologically, we would probably meet the requirements through our varied type of diet.

"That's not true with the horse, especially when you consider that the horse, under many conditions, is living under artificial circumstances. You are feeding him. He is not living under natural internal conditions, and his diet is markedly restricted when we feed him, irrespective of the fact that you may give him the best in the way of long forage and concentrates. From the standpoint of equally natural conditions under wild life, you have to have something else. So supplementation is important. We believe riboflavin to be excellent insurance against this too prevalent disease."

The following question was put to General Kelser by Mr. Wayne Dinsmore, Secretary of the Horse and Mule Association: "Where animals are on excellent pasture, on good ground, and where they have choice, long forage, including choice green alfalfa hay, will they not then be able to synthesize from that enough riboflavin to take care of them?"

The General's reply was: "We don't know. We think perhaps

there are several things involved. . . . But we certainly know we can prevent it ("moon blindness") if you have a high riboflavin content in the animal feed, and that those levels have not been possible of attainment even with the best feed we can give. . . . If I was in an area where there has been trouble with periodic opthalmia, I would spend a penny a day and add crystalline riboflavin to the diet."

The booklet contains addenda by Secretary Dinsmore as to where to obtain riboflavin, its cost, dosage, etc. In addition to valuable information concerning other animal diseases such as influenza ("shipping fever"), sleeping sickness, anthrax, glanders, tetanus and dourine, the booklet gives General Kelser's constructive advice on the general care and treatment of work animals, based upon their use by the Army under conditions where they could be utilized to best advantage. Here is a publication from which any owner may add to his knowledge of horses and mules to a degree that will prove both interesting and of great practical advantage.

Red Danes—a New Dairy Breed

Condensed from Successful Farming

Jim Roe

THE United States now has a new breed of dairy cattle—its first since the 1880's. In quiet, down-to-earth tests in this country since 1936, 20 Red Danish cows and 2 bulls have produced descendants which have consistently yielded startling results at the milk pail and in the feed lot.

With the formation of the American Red Danish Cattle Association at East Lansing, Michigan, last December 13, sponsors of the breed have served notice that Red Danes are now ready to go to work on America's farms.

They've had their working clothes on ever since they stepped from the fast passenger ship which whisked them across the ocean from Denmark. Red Danes have proved themselves in the purebred herd at U.S.D.A.'s Beltsville, Maryland, experiment farm. And—of vastly greater importance—they've done jobs that are nothing short of sensational on more than 65 Michigan dairy farms. Not fancy, city-financed farms, either. These farmers live on their milk checks, and they've seen Red Danes make those checks grow, year after year.

Reprinted by permission from Successful Farming, Des Moines, Iowa, Feb., 1946

That dual-purpose characteristic is one of the important reasons why Henry Wallace, then Secretary of Agriculture, obtained special permission from the government of Denmark to import the original cows and bulls to America for testing and increase. Dean E. L. Anthony, of Michigan State College, went to Denmark to make the selection. The tests since 1936 have been in charge of O. E. Reed, chief of U.S.D.A.'s Bureau of Dairy Industy, and M. H. Fohrman, dairy husbandman in charge of breeding investigations for the U.S.D.A.

Bulls from the imported cows have been loaned out to farmers in Michigan. No bulls went to purebred herds—all were grade herds of mixed breeds. They included Holstein, Guernsey, Jersey, Shorthorn, and even some Hereford cows.

"We have been breeding the meat off our dairy animals," Baltzer points out, "and we've bred the milk out of our beef breeds. We have reached the place where we have to use dairy cows as nurse cows in beef herds, because the beef cows don't give enough milk to raise their own calves. And our dairy cows are so far the other way they bring a pretty low price when they move to the stockyards.

"And that price is important. Dairymen usually figure their milking herd changes completely every five years. By that time, on the average, the herd will have been replaced with new, younger cows. If all those cows that are sold during that 5-year period can milk well during their productive life, and still carry a good flesh covering when they must be sold for meat, it makes quite a difference in a dairyman's income.

"That's what the Red Danes do. They are deep-bodied, comparatively short-legged animals. They have strong middles and good top lines. And they have excellent udders. I call it a streamlined, modern udder. It's well attached at the rear, and tucked up close to the body. The true Dane color is a deep, cherry red, and that color helps them sell at the stockyards—just as does their better flesh covering.

"The real secret of the breed lies in that one great hereditary trait—*consistency*. Not just one bull of a dozen proves out. They all do! In about 30 bulls and well over 2,000 first-second and third-generation calves from those bulls, there is yet to be a disappointment."

Sanilac County's George Huessner puts it this way: "I have 15 Red Dane crosses in production, and they each are doing better than their dams. A 2-year old, first-cross Dane will milk as much as her mother of another breed does as a mature cow. My herd fat test was running way down around

3.0 to 3.2; it's now up to 3.5 and 4.0 And I'm getting as large a volume of milk as I did from Holsteins."

"Another first-cross cow, from a Shorthorn dam and Danish bull, gave 10,177 pounds of milk and 421.9 pounds of fat during 230 days as a 3-year old, clearing $290.50 over her feed in that time. She was working for me every day.

"A DUAL-PURPOSE cow is what we had in mind,"Harry explains. "There are so many diseases that hit dairy herds that a cow's average productive life is only four or five years. If we have cows that beef out at the end of that time, it's like having our eggs in a couple of baskets. And the Danes are doing it, for my cows have been weighing 1,400 to 1,600 pounds."

Holger Rasmussen agrees. "They won't finish out like a Shorthorn or Hereford," he acknowledges, "but they'll lay it on just as cheaply. And they're very rugged, good feeders. On top of that, they are good milk producers. One of my first-cross cows from a Jersey dam and Red Dane bull gave 103 pounds of butterfat during the first month of her fourth lactation. As a 4-year-old she paid me $236.20 over her feed costs, and this year she will go to $250."

Holger can back up his opinion on Danes as feeders by the results of feeding trials at Michigan State College. Sanilac County Red Dane breeders sent 12 first-cross steers to Michigan State College where they were put in lots with steers from registered Hereford and Angus stock. They were fed for 196 days before being weighed and graded.

The Herefords and Angus averaged a 410-pound gain, for 2.1 pounds per day each. The Red Dane steers slightly more than held their own in gains, putting on 424 pounds apiece, for an average of 2.17 pounds a day. The registered Hereford and Angus steers graded "choice," the Danes "Medium." The Red Dane steers, Mr. Baltzer reports, have consistently brought two to three cents a pound higher than dairy-breed animals on Michigan markets, with the spread often being markedly higher.

To get a large cow, the first requirement is a large calf. Basil Redmond testifies to the fact that Red Danes leave nothing to be desired in this connection. "I had a mixture of Holsteins, Shorthorns, and Guernseys before I started with the Red Danes," he reports, "and the Red Dane calves are running from 5 to 10 pounds apiece heavier than they did from my other cows. And these larger calves are from bulls which are no larger than the bulls I used to use. They're large, thrifty calves and they start that

way. Volume of milk holds up about two months longer per lactation than it did with my other cows."

Now, if you're a top-flight herdsman, these records of 300 to 400 pounds of butterfat may not sound like the answer to a dairyman's prayer. But the Red Danes are capable of much higher production. One cow in the Beltsville herd has exceeded 1,000 pounds in 365 days.

And several dairy experts agree that, under the feeding and management of really expert dairymen, many of these 350 pound Michigan cows would certainly jump into the 600-pound bracket. The Sanilac County farmers who have devoted careful thought and much hard work to increasing and testing the breed are the first to tell you that they are not the most highly trained dairymen. Theyre average farmers who sell their grain and hay as market milk.

Even more sensational, tho, than the 1,000-pound record is the *consistent* improvement of daughters over dams, and the upgrading of some very common herds to the point where first and second-generation crosses of Danish bulls to lower-grade, unregistered cows result in herds as good as those of other breeds which are the result of years of following a planned breeding program.

Mark Swartzendruber, D.H.I.A. supervisor in Sanilac County, shows these figures: In his yearly report of the best three 2-year-olds and the best three 3-year-old cows among the 27 herds he tests, *four of those six high cows were Danes*—tho only half the herds are made up of Red Danish cattle.

"There is remarkable uniformity in udders, too, even tho the Danish bulls have been crossed with nearly every other breed. The over-all type of cow seems to be leveling out in the second generation. They are becoming uniform in appearance, consistent in production."

There is that term "consistent" again. In all discussions of Red Danish cattle, it's the most-used word. There's a good reason for that, and the newly formed national registry organization hopes to preserve that reason.

The key lies in the long-time breeding-for-production program which has been carried out in Denmark. Denmark is a feed-importing country, and boarder cows have no place in her scheme of things. Over 50 percent of all the cattle in Denmark are on D.H.I.A. test, as compared to 3 or 4 percent in the United States. The result? The 1,200,000 cattle in that country have an average production of 9,000 pounds of milk and 320 pounds of fat. The U. S. trails with averages of about 5,000 pounds of milk and 200 pounds of fat.

For registry in Denmark, an

animal must have official production records behind it. No cow or bull can be awarded prizes in the showring unless its production record proves it is as profitable as it is pretty. As a result of this emphasis on production, the Red Dane breed has more known inheritance for production than any other breed. That's what is behind the "consistency." There are comparatively few outstanding performers—but there are few poor ones, too.

The registry rules of the American Red Danish Cattle Association are aimed at preserving that record. Third-cross females in the Michigan herds are eligible for registry, and fourth-cross males will be allowed to be saved for breeding and recorded as purebred Red Danes. But on each pedigree there must be a production record extending back three generations. It is possible to register a Red Dane calf whose mother produced only 100 pounds of butterfat a year, but the pedigree must give the buyer that sad information. The effect will be, of course, to weed out the low producers.

"It works something like an abstract on property," explains Clarence Prentice, Sanilac County Agricultural Extension Agent. "The pedigree must carry the record back three generations, but if you want to go back farther than that, you can. Production records on all registered animals will be on file at the national office of the Red Danes.

"Thus, 50 years from now, you could check back on the ancestral production records of any animal you wished to buy, and see what his forebears produced—right back to the original animals imported from Denmark. This will permit the man with a small, producing herd to sell on an equal basis with the wealthy farm owner who can spend more in building up a reputation for his animals. The owner with a small farm herd may have just as good stock—if they're Red Danes he can prove it. Every producer of registered Red Dane cattle automatically must be a member of D.H.I.A."

Another feature of the Red Dane registry setup is that it is based on an open herd book. That is, anyone may get in the purebred Red Dane business by obtaining a purebred Red Dane bull and registering third- and fourth-generation calves. Soon you may even be able to become a purebred producer without ever buying a single new animal. When plans for artificial-insemination service—now being worked out—are complete, a dairyman will be able to develop his own herd of purebred Red Danes without a bull of his own.

"It's an incentive for every dairyman who is not now fol-

lowing a breeding program to get started on one," Mr. Baltzer emphasizes, "tho we don't recommend that thoughtful breeders of our other standard breeds desert their herds and take up Red Danes. We're not offering them as a competitive breed—merely an additional one which has a very definite place to fill. We aren't expecting a lot of 1,000-pound records. But we do expect a very high percentage of daughters who will give 300 to 350 pounds of fat regularly, year after year."

Green Pastures, Clean Ground Equals Hog Profits

W. L. Ruden

Condensed from Nebraska Farmer

SANITARY hoglots and good green pastures are an unbeatable combination for year in and year out pork profits.

Look, for a moment, at an analysis of 1944 account books of southeast Nebraska farmers:

Those who failed to provide sanitation and some pasture received only 30 cents a hundred above feed costs for their hogs.

Those who provided partial sanitation and some pasture received $2.

Producers who grew hogs on alfalfa pasture received a margin of $3.80 per hundred above feed costs.

The first group did not receive cost of production; the second group received fair returns for their labor after allowing for vaccination, shelter, and other incidental expenses; and the alfalfa pasture group produced hogs at a profit.

Here is the way the cost of feed, the principal expense in raising hogs, was figured. Grain was charged at local prices. Skim milk was estimated to be worth four cents a gallon with tankage at current prices. The pasture charge was based upon common rental rates. For example, alfalfa hay land is frequently rented for one-half share of the crop. Labor and equipment used to put up the hay are paid out of the other one-half share. Because hogs did their own harvesting, the pasture charge on land that would have

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produced around three tons per acre valued at $16 a ton was estimated at $24 per acre.

All feed consumed by the hog herd is included in the feed costs shown in the table. On farms where no pasture was provided, the feed cost averaged $12.30 for each 100 pounds of live weight produced. That was $1.50 higher than the $10.80 cost on farms where some pasture was provided, and $3.10 more than the $9.20 cost for hogs on alfalfa. The low cost on alfalfa was due primarily to the fact that those hogs consumed approximately one-fourth less grain for the same amount of gain than hogs raised in dry lots.

Hogs from the farms where the old hoglots were used, sold for an average of $12.60 after marketing expenses were deducted; those from the second group of farms brought $12.80, while the hogs produced on alfalfa pasture netted $13.

The 30-cent margin between selling price and feed cost on the dry lot farms did not pay the cost of vaccination, shelter, water, and other incidentals that are a part of the hog enterprise. Farmers operating on a 30-cent margin received nothing for their labor. In contrast, the margin of $2 received by growers who provided some pasture and partial sanitation gave a fair return to labor, and the $3.80 margin associated with legume pasture made hog raising profitable.

Good pasture replaces protein feeds. When skim milk is included, more pounds of protein concentrates were actually fed to the dry lot hogs than to hogs on pasture. In this comparison a gallon of skim milk is assumed to provide as much protein as one pound of high protein feed.

Sows on alfalfa weaned an average of 6.1 pigs per litter, those on grass or temporary pasture weaned 5.7 pigs, whereas the dry-lot sows weaned only 5.3 pigs per litter. Whether or not these differences were entirely due to feed and sanitation cannot be determined. Farmers who provide good pasture may also have given the sows a little extra care at farrowing time.

Wm. J. Loeffel, chairman of the Animal Husbandry Department, Nebraska College of Agriculture, says that alfalfa, where adapted, is the best hog pasture in Nebraska. A rye-barley and oats-sudan pasture rotation provides good substitute for alfalfa. Hogs are started early in the spring on rye. When the rye becomes unpalatable they are moved to another lot which is a mixture of oats and barley. The rye plot is plowed and seeded to sudan to be available after the oats and barley. Old oats and barley ground is seeded to fall rye to be utilized as late fall pasture. Professor

Loeffel believes that the total forage produced by this rotation system will equal that of alfalfa. Furthermore, tilling the soil twice a year is an excellent sanitary measure.

The relationship between hoglot sanitation and low cost production is known to many growers. When the margin between feed cost and selling price is wide, as it was in 1941 and 1942, practically anyone can make money on hogs. With present high feed and labor costs, the man who expects to make a profit must be efficient. Good pasture increases the returns per unit of cost by producing cheap, succulent, high protein feed and by keeping hogs away from old hoglots saturated with parasite eggs and disease germs. The foregoing facts and figures may be useful to hog growers when planning next year's operation.

Hog Production in Old Hoglots and on Pasture in 1944, Southeastern Nebraska*

Item	Old hoglots and no pasture	Partial sanitation and some pasture (Native grass, rape, rye, or sudan grass)	Clean ground and an abundance of legume pasture (Alfalfa or alfalfa and brome)
Number of records	5	14	11
Litters farrowed, spring	9	11	13
Litters farrowed, fall	0	3	3
Av. pigs weaned per litter	5.3	5.7	6.1
Total wt. hogs produced per farm, cwt.	119	217	316
Feed required per cwt. produced			
Grain, corn equivalents**	549	489	418
Alfalfa hay, lbs.	10	4	4
Skim milk, gal.	24	14	7
Commercial feed (25% or more protein) lbs.	14	14	19
Commercial feed (less than 25% protein) lbs.	3	10	7
Total feed cost	$12.30	$10.80	$ 9.20
Average net selling price	12.60	12.80	13.00
Selling margin above feed cost per cwt.	.30	2.00	3.80

*Records of feed consumption were kept by farm account book cooperators.

**One pound of wheat, 1.3 pounds oats, 1.1 pounds barley, and 1.2 pounds of rye or grain sorghum are each rated as the equivalent of one pound of corn.

A Sheep Plan Is Farm Proved

Condensed from Missouri Ruralist

SURE-FIRE plan of handling sheep for a profit can be condensed into capsule form. It's the Missouri Plan of Sheep Improvement, as recommended by the Missouri College of Agriculture and Agricultural Extension Service. It's farm-tested on hundreds of good flocks in the state.

Here briefly are the essentials of the plan:

Use of a good registered ram. This will add $1.50 to $2 a head to the value of each lamb produced, or $60 to $80 a year on the average-size flock of the state.

Plenty of good feed and proper management during the winter of the ewe flock will eliminate 90 per cent of the winter death loss from pregnancy disease. It also will increase the amount of wool produced 1 to 2 pounds a head.

Pasture for 9 months of the year will cut feed costs. Small grain for winter pasture will cut needed hay and grain in half.

Control of parasites, both internal and external, is a must. Small-grain pasture, lespedeza and sweet clover help control internal parasites. Treatment with bluestone and nicotine sulfate solution every 28 days during the summer is recommended. All sheep should be treated with phenothiazine in December and March for nodular worms. Dipping the flock in the fall for ticks and lice brings 1½ pounds more wool on each animal the next spring.

Early lambs bring more money. Those marketed by June 15 bring $1.50 to $2 more a hundred than those sold later in the summer. Early lambs also are affected less by internal parasites.

Docking and castration of lambs long has been recognized as necessary.

Grain feeding of early lambs results in lambs that are 10 pounds heavier, with fewer medium and cull lambs that sell $2 to $4 under top lambs.

Only fat lambs are marketed by the money-making sheepman, those weighing 80 to 100 pounds.

Shearing the wool and packaging it correctly increases its value 5 cents a pound.

On farms where these points are followed the return on money invested in sheep is greater than from any other class of livestock. This is for a period of years. Sheep also bring a rapid turnover of capital.

Reprinted by permission from the Missouri Ruralist, Topeka, Kansas, Jan. 26, 1946

One, Two, or Three Hatches?

Condensed from Poultry Tribune

G. T. Klein
Massachusetts State College

You'll scarcely find a commercial poultry grower in all of New England who figures that he can operate with only one hatch of chicks a year. Likely as not he'll be hatching twice and maybe three or four times.

It's the distribution of the egg yield which makes the spreading of the hatches so attractive. The shifting of the heavy production from spring to summer or fall, or to the time when eggs would bring the most money, has established year around hatching as a money-making scheme. It's useful, too, in the production of summer and fall hatching eggs.

Some years ago I saw figures from a commercial battery plant on the performance of pullets hatched at different times of the year. These birds were kept under environmental conditions which were similar. They were all raised in batteries, where temperature, summer and winter, wasn't too different. The production, egg size, and mortality of these hatches was so similar that one couldn't help but conclude that if environmental conditions were controlled, the performance would be similar.

On the poultry farm, it's impossible to control all environmental conditions, but there's enough that's good in fall and winter hatches to make it worth while.

Two hatches a year is the most popular system. Hatches of about equal size are brought off in early February and April. Good production stock hatched in February usually can be carried through the winter without a neck molt if lights and pellets are used. The neck molting is referred to by the breeder as a winter pause, which is an inherited character. Breeders have made wonderful improvement in selecting against it.

The next most popular plan is the January-March hatching. This gives the earlier summer production often needed in this area by the retailer of eggs. It also gives the producer of hatching eggs the summer production usually needed.

The January hatched pullets practically always go into a neck molt. The majority of such birds are sold when they go into this molt. They may start it in September or October or some may

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lay as late as November. At this time of year they are likely to hit a meat market that is high enough so that they bring at least their cost of raising, and the owner has had their production for four or five months from which to get his profit.

This is a particularly popular system with the hatching egg producer. These birds give summer eggs that are high in hatchability, far above that of hens which have been laying for many months. They give eggs with good shells which ship well. The system is particularly popular with the producer of broiler hatching eggs. This stock is not so highly bred for egg production and these pullets give their heaviest lay soon after coming into production; after four or five months they are sold for meat.

The hatching of chicks in the late summer or early fall is just a step farther with this program. The best dates for this brood are from August 15 to October 15, with preference on the earlier hatches. These birds get a few weeks on range, which we always feel gives better pullets. November and December hatches are not popular because of high costs of brooding, small body size, and small egg size.

Two or three hatches cut the overhead on the brooding equipment. It is expensive to use equipment only one time a year.

The housing of pullets hatched out of season varies with different operators. Usually the January or February hatches go to summer shelters for two or three months and then go to laying pens. The April pullets often go to the range for a few months and then are brought back to the brooder house until it is needed for brooding. In the meantime, there is heavy culling of the earlier hatches, and, by combining pens, there is room in the laying house for the April hatches by the time the brooder house is needed again.

The early hatches are sometimes housed in summer laying shelters which have small yards. The birds are held in the shelters as long as they lay profitably and then are sold as meat.

There's a decided trend in Massachusetts to the long brooder house, hot water heated. The fall hatches may be raised in this house until it is needed for brooding. Just what to do with them after that is an individual problem, with but little uniformity on the different farms.

Since we cannot control environmental conditions, we have variations in the performance of the different hatches. Poultrymen say there is more broodiness, smaller egg size, and smaller body size in the off-season hatches. Experimental proof is lacking on the point, but it certainly appears to

be the case. The nearer to the normal March, April and May hatching season the broods are brought off, the more nearly normal will be the performance.

For one who operates a retail business on either poultry or eggs, two or three hatchings are absolutely necessary. It is impossible to have an even flow of eggs and poultry without it.

Goodbye Mr. Rat

Condensed from The Farm Journal

John A. Rohlf

Not all of the killing weapons developed during the war were bad — at least not from the standpoint of the farmer.

Now come a pair of new rat-killers, whose powers stagger the imagination. They are both products of the laboratory, poisonous synthetic chemicals.

Perhaps the most spectacular is "1080," so called because it was the 1080th chemical in a long series tested for rat-killing properties. Scientists at the U. S. Fish and Wildlife Research Laboratory at Patuxent, Maryland, first discovered the poisonous properties of 1080, chemically sodium fluoroacetate.

That was only 18 months ago, but since then 1080 has been tested extensively, and probably has no peer as an all-round rodent killer.

But, unfortunately, it is not a "selective" killer like red squill (which kills rats but causes humans or domestic animals to vomit before any damage is done). Rats can't vomit, so it kills 'em.

1080, a white, odorless preparation, *kills humans and livestock just as quickly as it does rats, and so far there is no known antidote!*

There is also a danger of "secondary" poisoning with 1080; that is, if dogs, cats, or other animals eat rats that have been poisoned by 1080 they will be killed too. Dogs and cats are from 30 to 60 times as sensitive to the poison as rats.

Because it is such a deadly poison, 1080 will probably not be used on farms. At present only professional exterminators can buy it.

Of more interest to farmers will be Antu, an abbreviation of its jaw-breaking chemical name, alphanaphthylthiourea. Antu, sudden death to the common brown or Norway rat, is also a powerful killer, yet isn't as dangerous to humans or stock as 1080.

Antu should be on the market

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soon, perhaps by late spring. Right now the entire output is going to professional pest-control operators, cities, and rodent-control groups where it is urgently needed. Antu will be sold in ready-to-use forms under various trade names.

Its killing power, discovered by Dr. Curtis P. Richter of Baltimore's John Hopkins Hospital, was proved in extensive tests in that city. *One pound of Antu can kill* 200,000 *rats.*

It has one weakness. If the rat doesn't get enough poison to kill him the first time, he builds up a resistance to it. So you have to be sure that he gets a killing dose the first time.

At least six effective ways have been found to use Antu: (1) in a 2% to 5% mixture with finely ground grain such as wheat or corn; (2) as a spray or dust on ground grain or fruits and vegetables; (3) as a dust, either in pure form or mixed with flour, to be placed in runways or on floors; (4) as a dust on the surface of water; (5) as a dust blown into the burrows and holes with a standard dust pump; and (6) as a suspendable powder in water.

Antu is poisonous to dogs, pigs and other meat-eating animals, although such animals usually vomit it up when food is present in the stomach. It is not poisonous to domestic fowl, plant-eating animals, and probably not to man. At least, tests on monkeys have shown no ill effects. Researchers are working on antidotes, at least one of which, cysteine, holds promise.

In developing 1080 and Antu, hundreds of chemicals were tested. War cut off our best sources of poison, the only effective way of controlling the rat population. We had been importing much of our red squill from North Africa and Italy, thallium from Germany and France, strychnine from North Africa. Phosphorus and arsenic supplies were low. Rats are always a big problem to farmers—during the war they became an outright menace because of the shortage of good rat poisons.

Something had to be done and was. Federal and commercial scientists joined forces and came up with powerful 1080 and Antu.

Had they been unsuccessful, the rate might well have become the No. 1 international saboteur. For, next to man, the rat is the most destructive mammal we have. As a carrier of disease, he has killed more people than all the wars in history combined.

From the farmer he takes a toll of millions of dollars each year in grain eaten and destroyed, buildings damaged, fires started, animal disease spread.

Treat That Seed Grain

Condensed from The Farmer

Unless seed grain and flax are treated one or all of three families of mold spores may destroy upwards of 10% of the crop.

The two most important are Gibberella and Helminthosporium. The first is a double-barreled crop threat. Its spores are pink, they cling to the seed coat or get beneath it, begin reproducing at a terrific rate as the seed germinates, and attack and kill the seedling plant. If the killing isn't done then more spores of the same type attack the head about blooming time and are responsible for the common scab of wheat and barley. Treating won't destroy the spores and thus prevent the loss that comes of scab, but it will destroy the spores on the seed and prevent the death-dealing seedling blight.

Helminthosporium too, is a two-way worker. It causes seedling blight, and later attacks the plant itself, causing a head blight and is responsible also for leaf spotting.

Third and least destructive of the trio but important anyway is Alternaria. It also is responsible for blighting of seedling plants.

To learn just how much destruction these disease-producing spores cause, scientists at all the Northwest colleges of agriculture have conducted many experiments. As would be expected, they have found that seed produced in a year of abundant moisture carries a heavier infection than seed produced in dry years. Therefore during the recent years of abundant moisture, treatment to destroy the spores on the seed has shown excellent results.

The outcome of trials with treated and untreated seed is sometimes amazing. An example is the result of an experiment with treated and untreated seed by Canadian scientists. New Improved Ceresan, most common of seed treating materials, was used. Wheat yield was increased from 19.4 bushels per acre in the untreated lot to 42.9 bushels in the treated lot. Barley yield was increased from 45.7 bushels per acre to 53.8. More common than such results as these are increases of seven to 13 or 14%.

But who would complain if by investing three to six cents a bushel on seed treating, the difference depending upon whether the seed is custom treated or the work done at home, he could get a re-

Reprinted by permission from The Farmer, S. F. & W., St. Paul, Minn., Jan. 20, 1945

turn of one and one-half to three bushels an acre. That would amount to about 1,000% on the investment.

It is estimated that only 47% of Northwest seed grain and flax are treated in spite of rather general knowledge that treating does pay. Perhaps the reason for this is that the trio of spores do their work of destruction unnoticed, and because they are invisible to the naked eye even when present in large number on the coat of the seed. The seed is planted, the spores start reproduction under the surface of the soil and soon there is a ball of fur-thick mold around the seed. The seedling plant is either killed or so weakened that it never produces as it should.

None of the varieties of small grain or flax are resistant to these seedling blight diseases. In fact, some of the most popular varieties are most susceptible to them. Rival wheat is a susceptible variety, and Bolley Golden flax and Crystal flax also are highly susceptible.

Why haven't plant breeders bred for resistance to these diseases along with resistance to rust and the various smuts? The answer is that scientists take their problems in the order of their importance. Since there was no treatment and no other way to fight rust than to breed resistance to it, the scientists attacked that problem and in wheat have been very successful. But the seedling blight diseases can be whipped another way; by treating that is neither expensive nor time-consuming so it likely will never get an AA-1 priority rating as something to be conquered by the scientists.

In some parts of the Northwest there are men in the custom treating business who have portable outfits and who go from farm to farm. Elevators in some communities have treating rigs and do the work for a nominal charge, but more commonly, if the work is to be done, it must be done by the farmer himself. One of the treaters easiest to build and easiest to operate for the farmer who has 25 to 50 bushels or even a little more is the Minnesota Treater.

A method of treating without the use of special equipment is by dropping the dust—only a half ounce per bushel is required—on grain as it is run through a small, portable grain elevator. Because every precaution should be taken to prevent breathing the dust, care should be exercised in the use of any device. Dust masks used by some farmers during threshing are excellent. The seed should be treated out-of-doors and the treated grain should be caught in sacks to prevent spread of the dust.

Unlike the older methods of

treating, the new treating material may be used now on grain to be seeded in the spring. In fact, it is better to do the treating as early as possible, and then the job is done and won't be there to plague you when there are the usual one-thousand-and-one jobs that must be done at seeding time.

UNRRA Sends Hatching Eggs by Air to Europe

UNRRA has flown the first crates of hatching eggs to Czechoslovakia to help farmers reestablish their poultry production, according to E. R. Henson, Director of Agricultural Rehabilitation Division for the international agency. Arrangements were made for the eggs to leave La Guardia field, New York City on a regular schedule flight of the American Airlines System to Stockholm, Sweden. From there they were transhipped by Swedish Airways to Prague where they were sent immediately to the Czech hatcheries for incubation.

About four hundred thousand eggs are going forward to Czechoslovakia from U. S. poultry breeders between now and the middle of April.

Poland, Yugoslavia, Greece and Albania among the countries receiving UNRRA aid, are expected to share in the poultry program this spring. In addition to hatching eggs, several hundred cockerels and pullets are going forward by boat. Several hundred incubators have been landed to aid in the reestablishment of European hatcheries.

Poultry numbers in these countries were greatly reduced during the war. Czechoslovakia and Yugoslavia each suffered a fifty percent loss. Greece lost over a fourth of her poultry, and Albania an estimated twenty percent.

To partially restore these losses, approximately one million, five hundred thousand hatching eggs will come from the United States, and about five hundred thousand from Canada and the United Kingdom. The cockerels and pullets, though limited in number, are being carefully selected for breeding. The establishment of several key hatcheries is underway.

Poultry from UNRRA eggs will be at first used largely as

foundation stock, and not for a quick meat supply. With this assistance poultry raisers in the UNRRA countries should be able to restore their flocks to prewar numbers by 1947.

Rebuilding of the poultry flocks has from the beginning been a part of the plan for agricultural rehabilitation. However, the first peacetime crops had to be planted primarily for direct human consumption and could not include grain for poultry feed. By next spring and summer European agriculture should be restored to the point where enough feed can be raised locally to support an increase in poultry numbers.

"At the present time one sees very few chickens on European farms," said Mr. Henson, who made a survey tour of several UNRRA countries last fall. "In a small village in Dalmatia a woman who possessed one lone hen hit on a plan to increase the food supply. She scouted around, located a rooster a good distance away and every few days she would walk ten long kilometers carrying her hen to that rooster. She got her reward: soon there were fertile eggs for hatching."

Twenty-five crates of the first shipment of eggs were single comb leghorn eggs and five crates were single comb Rhode Island red eggs. The total amount of hatching eggs to be sent to Czechoslovakia will be divided equally between these two breeds.

What About First Calf Heifer's Calves?

Condensed from The Ayrshire Digest

On a number of Ayrshire farms there has become established a policy of raising few, if any, calves of either sex born to first-calf heifers. Although the reason for disposing of the bull calves may be obvious, it seems as though the slaughter of female calves born to heifers is an unnecessary loss to the breed, thus presenting a condition that may need correcting.

The reasons for refusing to give heifers' calves a start in life are usually included in the following: (1) High cost of milk and labor, particularly on farms catering to a fluid milk trade; (2) previous experiences in retaining heifer calves whose dams as first-calf heifers later demonstrated that they were inferior producers, and in some cases the calves themselves also proved to be poor milkers; (3) the physical appearance of the calves dropped by young, first-calf heifers may be such that only a confirmed optimist would have the courage to invest milk, grain, and labor in them. With this may go the belief that heifer calves are not as vigorous as those born to older cows; (4) calves out of first-calf heifers are in many cases sired by bulls with entirely too little to commend them.

Obviously, an efficient dairyman is not going to continue with a practice that shows a loss. If milk and labor are high and if his resources in the form of land, feed, labor, and buildings can be more profitably used in producing milk instead of using a portion of them for raising replacements, he may be among the first to give up the raising of calves from first-calf heifers—or from any females, for that matter—provided of course that he can buy replacements economically and efficiently.

The pros and cons of the question have been good for a debate at any time around the fluid milk markets of California, Chicago, and the Northeast.

At the opposite pole are the farmer-breeders in those areas of abundant feed and cheaper labor who raise practically every heifer calf that is born. Between the extremes of these two groups of cattle owners are farms on which there are varying degrees of economic conditions that decide the chances that calves have for the right to live, as well as their standard of living provided their lives are spared.

It is generally believed that the average number of calves per cow is about four, which means

Reprinted by permission from The Ayrshire Digest, Brandon, Vt., Jan., 1946

an average of only about two heifers per cow. With full realization that there are only an average of about two heifer calves per cow, the importance of these two heifer calves to the breed becomes a serious matter. First of all, it is important that they be calves of desirable breeding, which means that they should be sired by bulls of undisputed merit.

At present one of the serious problems in herd improvement is the relatively low standard of the bulls to which a great many young heifers are bred. On entirely too many farms there are two standards for bred sires. The cow herd may be bred to a first class proven sire, while the heifers may be mated to a young sire of much lesser pedigree. In some cases, a bull for which there was no buyer may be turned to pasture with the virgin heifers. A review of the pedigrees of the heifers born to first-calf heifers on many farms will show that the breeder's ideal has been reversed and that instead of the top cross adding a stronger influence for improvement, it is sometimes not really as desirable as the pedigree of the dam.

Although, because of physical reasons, the natural mating of proven sires to young heifers is not popular with many breeders, the expansion of artificial insemination, particularly within herds should result in an increase in the number of better bred calves born to heifers. Artificial insemination as now designed for mass breeding is hardly adapted to the plans of progressive breeders, but with the aid of trained herdsmen and veterinarians, there are possibilities of quite a revolution in breeding plans for the heifer branch of the herd.

In the event that artificial insemination is not available, there is still the possibility of improving a herd by making certain that the first-calf heifers are bred to the choicest young sires available. To insure herd progress, these young bulls should be even higher in pedigree value than the senior herd sire. Although such young bulls may represent a considerable investment on the current market, they are necessary if progress is to be made—and on the whole they should prove good investments.

Calves born to first-calf heifers should be so bred and so raised that they will make a valuable contribution to any herd. If bred and started right there should be no question about the economics of raising them. Each crop of heifers should write a better pedigree than their dams, but certainly the reverse will be true if heifers are mated to any convenient registered sire just so they will be brought into production.

More Vegetables for Less Money

Condensed from Better Crops With Plant Food

V. A. Tiedjens

Virginia Truck Experiment Station, Norfolk, Virginia

THE total acreage of truck crops including mint, white, and sweet potatoes grown in the United States in 1944 was in excess of 7,500,000. Of this total, 17 per cent was located in the Northeastern States and 30 per cent in the Gulf and South Atlantic States. A large part of this acreage is on Coastal Plain soils. Except for isolated areas, the soils on which these crops are grown are predominantly acid, requiring large quantities of liming materials to produce maximum yields. Many of these soils have been farmed for years and have gone through several cycles of depletion and rejuvenation. They are, comparatively speaking, low in nitrogen, phosphoric acid, and potash. It is not surprising, therefore, that these same areas use almost 60 per cent of the fertilizer sold in the United States. A large part of this fertilizer is used in the production of vegetable crops. White and sweet potatoes, tomatoes, sweet corn, green peas, snap beans, watermelons, onions, cabbage, and spinach make up most of the vegetable acreage.

Much of the acreage devoted to vegetables in the Corn Belt and neighboring states also is highly acid but has a higher potential fertility than the Coastal Plain area. Neither the lime nor the fertilizer requirement is as high and more manure is available, since many vegetables in these sections are grown as cash crops on dairy farms.

The fertilizer requirement of most vegetable crops is measured in tons per acre, while field crops have requirements of less than 1,000 pounds. In the seaboard states, where the soil is potentially low in fertility and where intensive vegetable crop production is being practiced, it is not uncommon for growers to use 20 tons of barnyard manure, two tons of mixed fertilizer, and 500 to 1,500 pounds of nitrate of soda to grow three crops during the year. Celery growers have used up to three tons of fertilizer per acre in this area. This high fertilizer requirement is partly due to conditions which have developed in the soil, preventing the roots of crops from exploring the

Reprinted by permission from Better Crops With Plant Food, Washington, D. C., October, 1945

soil below the plowed furrow. Where this condition has been corrected, tremendous increases in yield have been obtained with much less fertilizer.

Not so many years ago most vegetables were grown with animal manures and on a much less intensive scale. The increase in land values, taxes, and labor costs, the substitution of manure by chemicals, and the failure to use lime, have been the basis for many problems, since they intensified the use of the land without proper restoration between crops. The experiment stations have only recently begun to correct these problems, yet those few growers who have studied them and instituted corrections have harvested yields far and above their most optimistic expectations. A man who can grow more than 1,200 bushels of spinach on land where formerly he was glad to get 300 bushels hardly needs to be convinced that he is on the right track. And when he grows the crop with the same amount of fertilizer and very little more help, he begins to wonder whether his father knew as much about farming as he had given him credit for in the past. These growers have taken an active interest in their experiment station and are willing to turn their farms over for further cooperative work. Unfortunately, for every one of these, there are nine who do not care and they are the ones who are responsible for our low average state yields.

Plowing-under animal manure with a good cover crop of clover is far different from placing an equivalent amount of "hot" fertilizer in the row, as far as the vegetable crop is concerned. Unfortunately, too few of us have appreciated what was taking place. We are trying to do with nitrogen, phosphorus, and potash in concentrated amounts what we formerly did with animal manure, a product that not only added the above three ingredients but also lime, trace elements, organic matter and hormones. These were well distributed throughout the soil, so that at no time did the plant have to gorge itself with plant nutrients.

As more and more chemical fertilizer has been used to replace animal manures, changes in the soil which have resulted in decreased yields have been brought about. Soils have become depleted in lime and there has been a tendency for the roots of our crops to remain in the plowed layer of soil. Gradually we have seen erosion taking away our surface soil because rain-water would not penetrate rapidly enough. Our crops have suffered during dry spells because they had to depend on the eight-inch surface layer for their water instead of the three or four feet

below to which the plant was entitled. Yields have decreased, and to halt this decline we have used more and more fertilizer with the result that our fertilizer placement problem has grown, and we actually are beginning to wonder whether we can maintain a much larger population in these United States.

Strange as it may seem, the correction of the problem is in our door-yards through the interaction of an inexpensive product—the millions of tons of limestone which only need to be pulverized and applied to the soil. The use of lime is not new nor are its effects on the soil new, but gradually it has disappeared from our soils and fertilizer residues have filled the void. We are back to where we started some 75 years ago to reclaim supposedly worn-out and badly eroded soil. This time, however, we must do it with fertilizer and lime because there isn't manure enough to go around. We don't want to make the same mistakes a second time. Fortunately, we have considerable evidence to keep us more or less on the right track.

If we recognize the problems, we should be in a position to offer remedies. Our big problem is to get water to penetrate the soil, and roots to penetrate the subsoil. Many of our soils that are well-drained are poorly aerated. Sensitive vegetable crop roots are not adapted to poorly aerated soils. We must eliminate temporary pond holes which are becoming more and more frequent along the Eastern Seaboard.

We are getting into trouble from fertilizer burning the roots because we have stepped up the quantity and built up concentrated residues which have interfered with the movement of water to the plant. As a result, growers are becoming convinced that irrigation is the only solution to the problem. It may be necessary in some instances, but its need has been greatly over-emphasized. During any dry spell when crops need water, idle irrigation lines can be observed because the growers say they do more damage than good. This simply emphasizes the fact that we don't know enough about irrigation. This is a serious problem, and if corrected our state average yields will be more than doubled.

Getting the most for the fertilizer that we apply on naturally acid soil is a serious problem about which we can do something. Not only is it necessary to maintain the proper balance between the nutrients in the soil, but we must add calcium and magnesium to sweeten the soil to the point where roots will function properly. This does not mean reducing the acidity only in the surface soil. The acidity must be corrected to considerable depths in the

lower horizons. This holds true for all crops except white and sweet potatoes where the surface soil should remain below pH 5.5. There are very few acid soils growing vegetables containing sufficient calcium. Before we can expect to harvest maximum yields of vegetables which are suitable for human food, we must satisfy the lime requirement of the particular soil type. This may mean one, two, three, or even ten tons per acre. If pulverized limestone is used, comparatively large quantities can be applied in a given year to hasten the time when maximum yields may be expected. If hydrated lime is used, it must be applied in small quantities over a longer period because its use can quickly throw the nutrient balance out of line. If, as when growing potatoes, we must farm acid soils, we must be satisfied with the yields we get. In some cases this is not too serious on certain soil types, since approximately maximum yields can be grown under these conditions.

Over-liming?

Many of our growers have used one ton of liming material to the acre and have become discouraged because they saw no appreciable response from the treatment. Growers have heard more about the dangers of over-liming than about the advantages. This has come about from the use of hydrated lime under certain circumstances. As a result, the grower hesitates to put on more than a ton to the acre. I have encouraged growers to apply on strips one, two, three, four, and five-ton per acre applications of pulverized limestone, and in many cases they have found that the only application that had any effect was the five-ton application. One grower who tried this covered his farm with the maximum application of five tons and got more yield from two crops of spinach than he formerly did from four. As a matter of fact, this yield was the highest I ever heard recorded. And when he dug down to see where the roots were, they were found in abundance at the three-foot level and still going down. The important observation was that the crop was grown with the same amount of fertilizer that was formerly used for four crops.

Crops whose roots go down to the three- and four-foot level do not suffer from ordinary dry weather. We grew 14 tons of tomatoes per acre on soil with no rainfall between the latter part of May and the first week in September. The roots on these plants went three feet deep. They seemed to get sufficient moisture even though the surface soil was dust dry.

Unless a grower is willing to

satisfy the lime requirement of his soil, he cannot hope to get the most from his fertilizer. I am reminded of a tomato grower's experience. He seemed to have done everything wrong as far as most recommendations were concerned and yet he grew the second largest yield in the state. He planted late, he used over-grown plants which any other grower would have discarded, he used too little fertilizer, and paid little attention to cultural practices. However, on close investigation I found he had applied a ton of limestone each of the 17 previous years. The pH was above 7.0. The roots went down as far as we could dig. It is experiences such as these that convince me that the first consideration in preparing Coastal Plain soils for vegetable crops is to satisfy their lime requirement. For sweet and white potatoes the problem is more complicated. Lime must be placed in the subsoil, but the plowed layer must remain below pH 5.5. This involves special subsoil applicators which will be available in the near future.

There probably is no one best method of applying the fertilizer, although some placements have advantages over others. The fertilizer-placement problem becomes less serious as the lime requirement of the soil becomes satisfied. However, fertilizer must be so applied that it will not injure the roots of plants. Thus, any departure from the old method of applying the fertilizer in the row under the plants will result in increased yields because of the removal of the danger from injury. Yet, that does not mean maximum yields. We want to be in a position to use the amount of fertilizer needed for maximum yields without injuring or interfering with the growth of the crop. There are so many fixed charges in growing an acre of vegetables that any additional yield we can get from using more fertilizer means clear profit. How that fertilizer is incorporated in the soil, assuming that the soil is properly limed, will determine how much the crop will use to advantage. As far as possible, when the fertilizer is mixed with the soil, we should have a physiological equilibrium, established soon after its application. This means that there must be no interference with the movement of water to the plant nor the free growth of the roots through the soil. Unfortunately, we cannot eliminate this entirely because we do not have available ingredients for making up the ideal fertilizer. The best of them will build up concentrations, but these can be minimized by proper placement of fertilizer to encourage deep root penetration.

If all the fertilizer can be applied in one operation, it means saving in labor and reduced

costs. If this can be done and at the same time give good distribution with minimum injury to the crop, we will have accomplished much in fertilizer placement.

In surveys made in recent years on the tomato and sweet potato crops it was found that growers were using 11 different methods of applying fertilizer. Highest yields were obtained where most of the fertilizer was applied deeply in the soil. Each method supposedly had some advantages, but many had more disadvantages than advantages.

The methods could be grouped under two headings: those that distributed the fertilizer generally through the soil, such as broadcast applications before or after plowing and solution methods; and those that concentrated the fertilizer in localized areas, which included all band and row methods, sidedressing methods, and dry subsoil applications.

Since most of the fertilizer applied in the past has been by concentrated placement, these methods will be discussed first. The band method has come into use as a means of eliminating fertilizer injury to the roots, one of the objections to the row furrow method. In this method the field was marked and the fertilizer was applied in the furrows left by the marker. Then the soil was hilled over the fertilizer and the plants set on top, or a horse cultivator was run through the fertilizer to mix it with the soil. There were a number of modifications. Fertilizer was placed on top of the seed in some cases. Those with an old potato planter, used it to apply all their fertilizer for wide row crops. The hill method of throwing a handful of fertilizer into a hole before the seed was dropped in or the plant was set was another modification. These methods had some virtue as long as small quantities of fertilizer were used, but when growers started using between 1,000 and 3,000 pounds of fertilizer they were in trouble. In wet years, their crops all went to foliage and in dry years the fertilizer burned the roots so that crop failures resulted. If weather conditions were "exactly right," yields were very good.

The band method was an improvement and eliminated many of the hazards. It increased average yields because it eliminated fertilizer injury. For quantities of 1,000 pounds or less of fertilizer, it had many advantages. Also, on acid soils it supposedly was the best method since it prevented phosphate fixation. However, it tended to restrict lateral root growth and contributed to shallow root penetration. In crop rotations, it had many disadvantages because fertilizer was only applied to the row crop. The un-

fertilized crop made a very uneven growth.

Placing the bands deeper at planting time or on the furrow bottom is an improvement since it encourages better root distribution and places the fertilizer where more uniform moisture conditions exist. It tends to lower the concentration in the immediate vicinity of the roots. Furthermore, for surface soils that must be maintained in an acid condition, it offers the possibility of applying small quantities of limestone without interfering with the pH of the surface soil.

For all general purposes over a period of years on soils that have been limed and where more than 750 pounds of fertilizer are to be applied, the methods that distribute the fertilizer more generally through the soil have produced larger yields and probably account for the growing popularity of plowing fertilizer under.

Broadcasting the fertilizer after plowing is a common practice. If the fertilizer is thoroughly mixed with the soil by means of a spring tooth harrow, it is fairly effective for narrow-rowed crops. A disc harrow does not satisfactorily mix the fertilizer and soil. Applying the fertilizer with a disc drill is a decided improvement over the broadcasting method. This places the fertilizer four to six inches deep in bands seven inches apart and has given as good results for tomatoes as any other method. If the ground is roughly plowed and the fertilizer is broadcast before the soil is leveled, the fertilizer will be distributed more satisfactorily than where it is applied after the ground has been leveled. This method is far more effective in wet years than in dry years.

Broadcasting the fertilizer before plowing has given uniformly better results over a period of years in our experimental plot studies than any other method, and its efficiency improves with the years. Theoretically it has many advantages and none of the disadvantages of the other methods. It not only supplies crops with a uniform diet throughout the growing season, but it places much of the plant nutrient materials deep enough so that more favorable moisture conditions prevail. This means much in terms of phosphate availability. The gypsum in super-phosphate, by being placed close to the subsoil, promotes better root distribution because of its effect on the clay. This phase of fertilizer placement has not been given sufficient attention. The effect on the soil in improving aeration probably accounts for the fact that the efficiency of the fertilizer seems to increase from year to year when applied by this method. The application of fertilizer by this method probably requires the least equipment and the least

amount of labor, and every grower who uses upwards of 800 pounds of fertilizer should try the method on his farm in comparison with other methods that he may use. On some acid soils it may not be as effective in promoting yields as some other method.

Side-dressing crops with fertilizers has been a common practice, but it is probably the most faulty method in use, and probably the least effective. There are too many things that can go wrong. The weather can be too dry. If the fertilizer is placed deep where it will do the most good, the roots often are cut off and the crop is checked. Side-dressing tends to concentrate the fertilizer close to the plants. Most crops should receive the plant food early in the season, but too many growers get it on too late. Side-dressing also tends to make the growth sporadic. The method is commonly used on sandy soils, but our results show that even on the lightest sands fertilizer plowed under is far more effective. If fertilizer is to be side-dressed, it should be applied in solution form.

There are many problem fields on all types of soil which respond to subsoil applications of superphosphate. These problem fields are the result of neglect. There has not been enough lime used to maintain a suitable pH in the subsoil. Surface applications of fertilizer have interfered with the beneficial effects that might have resulted from the action of gypsum on the subsoil. As a result our crops on such soils are shallow rooted, make sporadic growth, and yield poorly. The remedy for such conditions is sufficient magnesium liming material applied on the surface before and after plowing, deeper plowing, and broadcasting the fertilizer before plowing. In some cases it may take two or three years before maximum yields are obtained. The use of subsoil plows with attachments to apply moderate quantities of limestone and superphosphate in the subsoil will speed up the corrective action.

The use of transplanting solutions, starter solutions for seed-sown crops, and booster solutions for side-dressings offer tremendous possibilities for the future. Theoretically, they offer the ideal method of distributing fertilizer. Whether it is to distribute 10 pounds or 1,000 pounds, the fertilizer solution offers the most uniform method of applying fertilizer, and in many cases the most efficient method. Insoluble forms of phosphates, inadequate supplies of water, and lack of equipment for distribution are still some disadvantages which must be taken into consideration. Questions of proper distribution in the soil need further study. Compara-

tive yield data show that excellent yields of crops may be expected. Where less than 500 pounds of fertilizer are applied, the solution method has no equal.

Applying Nitrogen

A common practice is to apply nitrogenous fertilizers for side dressings. They have their place but generally speaking are unnecessary. It is a better practice to apply nitrogen with the mixed fertilizer deep in the soil. During the growing season the general movement of nitrogen and potash is toward the surface inch of soil. Only in wet seasons do surface applications of nitrogenous fertilizers give efficient results. In dry weather much of the applied material is wasted.

Spraying foliage with light and frequent applications of nitrogenous fertilizer has been successful on some crops. Upon further investigation this may prove to be an efficient method of applying extra nitrogen to crop plants. It would eliminate the hazards of salt concentration in dry seasons.

In summarizing this discussion, one might ask, "What is the poor farmer going to do?" It would seem that regardless of his location, he must find out for himself whether his soil is properly aerated. If his crops make free root growth to depths of three or four feet, his problem is not so serious. If the roots are mostly in the plowed layer, he certainly should use some liming material, the amount to be determined by test plots on his farm or calcium readings on his soil based on base exchange studies made by his experiment station staff.

The quantity of fertilizer that he uses must be determined locally. It will depend on how well the soil is limed and aerated, the crop he grows, and where he is located. If not more than 500 pounds of fertilizer are to be used, they might better be applied in solution four to eight inches under the plants with not more than 50 pounds per acre used as a transplanting solution or 100 pounds as a starter solution, directly on the seed as in the case of beans or peas. In the Midwestern States this method has much merit and may apply as much fertilizer as weather conditions will permit the crop to use.

The ratio of nutrients in any case must be determined locally. There is one thing that seems well established. As the lime requirement of the soil becomes satisfied, the potash level must be higher. The phosphate level need not be emphasized. In other words, where a 5-10-5 is being used at the present time, the grower may find that an 8-8-16 or a 10-10-20 in equivalent amounts will increase yields materially.

Where larger quantities of fertilizer are used, a deeper and

more general distribution is advisable and broadcasting the fertilizer before the ground is plowed followed with a transplanting or starter solution will probably give as good or better growth than any method that can be used. The only improvement on this would be to apply all the fertilizer in solution. Space does not permit a detailed discussion of this method.

On acid soils, for the present at least, some form of placement in bands deep in the soil should be used. Plowing two-thirds of the fertilizer under together with 500 to 750 pounds in a band at least four inches deep, may give better results. This depends on the type of soil.

On natural limestone soils, fertilizer should be plowed under if used in any appreciable quantity. When used in small quantities, the solution method of applying fertilizer will give best results regardless of where it is applied.

Less Hull on Early-Planted Oats

For years the experiment Station has urged New Jersey farmers to seed their oats as early as possible in the spring, knowing that the earliness of planting has a direct effect on yield. Now we have discovered another argument in favor of early planting. Not only do we get bigger yields when we seed oats early, but the grain has a smaller percentage of hulls. In tests at our seed laboratory we found that spring oats planted March 26 last year averaged 29.6 per cent hull, while oats planted April 13 averaged 32.2 per cent hull. Winter oats, which are not yet recommended for New Jersey had a hull percentage of only 24.9 per cent. Vicland oats still are far and away the most promising variety for New Jersey and the Northeast. Early maturing and resistant to disease, this oat has had no close competitor in our oat variety trials throughout the state.

N. J. Farm and Garden

Butterfat and Vitamin-Producing Bacteria

Condensed from Certified Milk

E. B. Hart, Ph.D.

Professor and Chairman of Biochemistry Dept., University of Wisconsin, Madison, Wis.

RECENT Wisconsin Experiments indicate that the kind of fat in the diet can exert an important influence on vitamin-producing bacteria in the digestive tract. This work is carried on with funds provided by the American Dairy Association and under the guidance of the National Dairy Council.

Ten different kinds of carbohydrate foods were fed to as many different groups of rats. Each of the ten groups was divided—part of them getting corn oil as the fatty portion of their ration and the others receiving butterfat. Some rats in each group were fed on a normal vitamin B level, some on a high vitamin B level and some on a high vitamin B level plus liver.

In almost all cases the rats getting the butterfat outgained those on corn oil. This was especially true of those on the normal vitamin level. Since butterfat itself contains only a negligible amount of vitamin B, the conclusion drawn is that the fatty acids of butterfat in combination with most carbohydrates bring about a condition in the digestive tract which encourages the development of those bacteria which help produce the important B growth vitamins.

The contrasts were especially noticeable in the case of rats fed butterfat and lactose, which is carbohydrate of milk, compared with those fed corn oil and lactose. The appearance of the rats fed corn oil and lactose was poor in all cases. They showed "bloody" noses and heads, poor fur and extensive baldness. Diarrhea was present and the intestinal tract showed gas and putrefaction. On the other hand, the rats fed butterfat and lactose showed good health, sleek coats and a gas-free intestinal condition.

Another important possible implication of this experiment is the importance of butterfat in infant feeding. In combination with several of the carbohydrates used in infant feeding formulae the fatty acids in butterfat were shown to develop growth-producing bacteria to a much better advantage through the development of vitamin B in the digestive tracts than did the fats of corn oil.

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Prevents Spud Sprouts

Chemical treatments which prevent potatoes from sprouting in storage have been developed. Two experiment stations have found the method effective and at least one manufacturer is offering the hormone. At Wisconsin the most effective material was the methyl ester of alpha-napthalenacetic acid. Russet Burbanks treated May 4 and then placed in 100-pound bags in common storage, still were unsprouted and in salable condition in September whereas untreated tubers of the same variety became unfit for sale in June.

Other Wisconsin varieties on which it was tried included Chippewa, Cobbler, Red Warba, Russet Rural and Triumph. The only unfavorable results were in the case of excessively-treated Cobblers which developed hard, knobby outgrowths in the bud area. No such effect was observed in other varieties nor in Cobblers which received a light treatment.

Several methods of applying the hormone were tried. It was mixed with talc or walnut-shell flour and dusted on the spuds; incorporated in emulsions of lanolin or ethyl alcohol and sprayed on; applied in form of bits of impregnated paper scattered among the potatoes.

Indications from these experiments are that effects of the chemical wear off gradually, which suggests that treatment should be undertaken in early spring before potatoes break dormancy rather than during fall soon after harvest. But the method enables storage even at ordinary room temperatures, and should permit growers to hold surpluses into spring and summer without suffering market deterioration or being forced to sell at the end of winter. One of the advantages is that local potatoes may thereby supply more of the local demand until new early crop becomes available.

Cost of the anti-sprouting hormone is high, Wisconsin experimenters report, but a little goes a long way in that 3 ounces properly distributed is enough to treat 100 bushels. Treatments should not be used on seed potatoes.

Capper's Farmer

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

A Living from Bees — By Frank C. Pellett, Field Editor of American Bee Journal. Orange Judd Publishing Co., Inc. $2.00.

America's Garden Book — By Louise Bush-Brown and James Bush-Brown. Charles Scribner's Sons. $3.50.

An Agricultural Testament—By Sir Albert Howard, C.I.E., M.A., former Director, Institute of Plant Industry, Indore. Oxford Univ. Press. $3.50.

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean of the School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $2.85.

Beef Cattle — By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Sons, Inc. $4.00.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers. $2.00.

Breeds of Livestock in America—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State College. College Book Co. $3.75.

Dairy Cattle Feeding and Management—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.00

Dairy Science—By W. E. Petersen. Ph.D., Assoc. Prof. Dairy Husbandry, Univ. of Minn. By R. W. Gregory. J. B. Lippincott Co . $4.00.

Diseases and Parasites of Poultry — By Edgar Hugh Barger, D.V.M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition (1943). $3.75.

Farmers of the World—The Development of Agri. Extension—edited by Edmund deS. Brunner, I. T. Sanders, Douglas Ensminger. Columbia Univ. Press (1945). $2.50.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.00.

Farm Management and Marketing — By V. B. Hart, M. C. Bond, L. C. Cunningham, all of N. Y. State College of Agriculture, Cornell University. Publishers: John Wiley & Sons, Inc. $2.75.

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. $3.00.

Grow Your Own Fruit—By M. G. Kains, formerly with U. S. Dept. of Agriculture; Professor of Horticulture, Pennsylvania State College. Greenberg, Publisher. $3.50.

Growing Tree and Small Fruits—By H. B. Knapp, Director, State Institute of Applied Agriculture, Farmingdale, Long Island, N. Y., and E. C. Auchter, Chief, Bureau of Plant Industry, U. S. D. A. John Wiley & Sons. $2.75.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Production—By Walter H. Peters, Chief, Div. of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $3.50.

Livestock Judging Handbook — By Julius E. Nordby and W. Malcolm Beeson, Ph.D., Asst. Professors Animal Husb., Univ. Idaho. The Interstate Printers. $2.60.

Natural Principles of Land Use—By Edward H. Graham,, Chief of the Biology Division of the Soil Conservation Service. Oxford University Press. 275 pages. $3.50.

Pay Dirt—Farming and Gardening with Composts — By J. I. Rodale. Devin-Adair Co. (1945). $3.00.

Palestine—Land of Promise — By Walter Clay Lowdermilk, assistant chief of the Soil Conservation Service. Harper & Brothers (1945). $2.50.

Pleasant Valley — By Louis Bromfield, author, farmer, soil conservationist. Harper & Brothers. $3.00.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry, Mo. State Univ. J. B. Lippincott Co. $5.00.

Practical Farming for the South — By Benjamin F. Bullock, now Prof. Rural Education, Atlanta Univ. Univ. of North Carolina Press. $2.50

Profitable Poultry Keeping—By H. Clyde Knandel, Head, Dept. Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Repairing Farm Machinery—By Ivan G. Morrison, Asst. Professor Agri. Education, Purdue Univ. The Interstate Printers & Publishers. $1.80.

Seaman A. Knapp—Schoolmaster of American Agriculture—By Joseph C. Bailey, Dept. History and Social Science, Hunter College. Columbia University Press. 1945. $3.25.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

The American Land—Its History and Its Uses — By William R. Van Dersal, biologist in the U. S. D. A. Oxford University Press. $3.75.

Successful Poultry Management—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.00.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.00.

Soil Conservation — By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Dept. of Agric. McGraw-Hill Book Co., Inc. $6.00.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

Weeds of Lawn and Garden — By John M. Fogg, Jr., Prof. of Botany, Univ. of Penna. University of Pennsylvania Press (1945). $2.50.

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